

Re-thinking gender and energy: Old and new directions

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Abstract

Women/gender and energy has emerged as one of the critical pathways for linking energy interventions to the Millennium Development goals. Yet, despite many efforts, energy poverty is widespread, and gender inequality exists at every level of the energy sector. At the same time, most poverty assessments and research exclude energy.

This paper is addressed primarily to researchers on gender and energy policy, and asks what approaches to policy research could help make the linkages among gender, energy and poverty more understandable and more convincing to policy makers and practitioners, both in the energy sector itself, and in the gender and development community. It attempts a “re-thinking” of the gender and energy paradigm, by looking both backwards and forwards.

This analysis seeks to initiate movement towards the development of an agreed framework for research on gender and energy that would be credible in both gender and energy communities. Most past gender and energy research has seen its primary audience as the *energy* community and has sought to respond to energy imperatives and frameworks. This paper seeks to explore the usefulness of *gender* theory in better explaining linkages among gender, energy and development.

It begins by offering a selective review of approaches to gender in energy research and policy in two areas: biomass energy and labour-saving energy technologies. Chapter 1 attempts to “unpack” key assumptions and concepts about gender in past research and policy on gender and energy in these sub sectors. Then, state-of-the-art conceptual frameworks are explored for relevance to future policy research on gender and energy. In Chapter 2, the sustainable livelihoods framework as adapted to the energy sector is analysed, and its contributions and limitations. In Chapter 3, recent gender analytical approaches are examined: new gender and poverty thinking, and new gender and environment theoretical frameworks, including feminist political ecology.

Themes from these frameworks that could be analysed in future case studies on gender and energy are then suggested, together with some possible hypotheses for exploration of gender-energy-development linkages. The analysis is focused on two questions of policy relevance:

- Is gender equality a key variable in the success or failure of energy interventions?
- Is improved access to energy a key variable in women’s/gender empowerment?

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Introduction

Women/gender and energy has successfully emerged on the international agenda, and is widely viewed as one of the critical pathways for linking energy interventions to the Millennium Development Goals (MDGs), for example to goals on women's education and employment, maternal health, child mortality, and even on income and hunger¹.

- Recognition of the enormous health burden of indoor air pollution – now estimated to kill 2 million women and children in developing countries every year – is one of the drivers stimulating what may be increased attention to household energy interventions in the coming years, counter-acting recent neglect.²
- Productive uses of renewable energy are more and more viewed as necessary to the successful dissemination as well as development impact of renewable energy interventions, though the link to women's income generation and human capital building is only beginning to be considered seriously.³
- Rural electrification is enjoying a revival in interest, in particular decentralised sources. Inter-sectoral synergies, poverty and gender linkages are receiving some attention.⁴
- A number of energy programmes in both North and South are starting to pay closer attention to gender and have launched important initiatives.⁵ Energy interventions are generally seen as potentially beneficial to both women and men in a number of ways, and there are now some specific experiences and documentation of some projects that have effectively involved both women and men as staff and entrepreneurs as well as beneficiaries.

Yet despite many efforts, energy poverty is still widespread, and gender inequality persists at every level of the energy sector. Energy and gender/poverty discourses remain, in most venues, far apart. Gender-sensitive energy projects and research are still the exception rather than the rule. The importance of bringing a gender perspective to

¹ For linkages between the MDGs and energy, see DfID's *Energy for the Poor: Underpinning the millennium development goals* (2002), and DfID (2000). For linkages between the MDGs, and gender and energy, see Havet (2003).

² See e.g. *The World Health Report 2002: Reducing risks, promoting healthy life*, which ranks solid fuel use as 8th in health burden worldwide and fourth in least-developed countries; ref. also the Regional Workshop on Household Energy, Indoor Air Pollution and Health, New Delhi, June 2002.

³ See e.g., *GEF-FAO Workshop on Productive Uses of Renewable Energy: Experiences, Strategies and Project Development*, FAO, Rome, 18-20 June 2002.

⁴ E.g., E. Cecelski, *Enabling Equitable Access to Rural Electrification: Current Thinking on Energy, Poverty and Gender*, Report to Asia Alternative Energy Unit (ASTAE), 2003 and the series of reports produced under the ASTAE EnPoGen project: IDS (2003), Madon (2003), Masse (2003), Matly (2003), Winrock, et.al. (2003), Heijnderman and Ramani (2003).

⁵ See A. Koerhuis and E. Cecelski, *Major Activities and Actors in Gender, Poverty and Energy*, Report to ASTAE/World Bank, 2003, which includes web links to many of the documents and organisations mentioned in this paper.

energy policy analysis and design is still not widely understood, and the conceptual basis for doing this is still lacking. Nor have the lessons from past energy projects as regards gender and poverty been fully integrated by national policy makers or multilateral or bilateral agencies. While many are sympathetic, gender is still commonly viewed as a political agenda, not central to questions of efficiency or effectiveness in the energy sector.

At the same time, most poverty assessments and research exclude energy, except, sometimes, in as regards rural electrification infrastructure. In social development sectors, energy proponents are frequently (and often correctly) suspected of having a hidden environmental or technology dissemination agenda. Working relationships between energy macro-economists/engineers and other social scientists have been slow to develop, with different “ways of thinking”. Most distressing, has been the difficulty in convincing sector experts that gender (for energy projects) and energy (for gender/social development projects) are key variables in project success.

While enormous quantities of empirical evidence on gender and sustainable energy have been generated in recent years, much is undigested, and frameworks for analysis are weak. Why is this important perspective not better integrated into mainstream energy research? Why have researchers and, by extension, policy makers and planners – who may indeed recognize the importance of these issues – yet not been entirely successful in making convincing linkages to their own work? What approaches could help make these linkages convincing? Perhaps it is time to review and examine: Are we asking the right questions?

This paper seeks to initiate movement towards the development of an agreed framework for research on gender and energy that would be credible in both gender and energy policy research communities. Most past gender and energy research has seen its primary audience as the energy community and has sought to respond to *energy* imperatives and frameworks. This paper seeks to explore the usefulness of *gender* theory in better explaining linkages among gender, energy and development.

It begins by offering a selective review of approaches to gender in energy research and policy in two areas: biomass energy; and labour-saving energy technologies. **Chapter 1** attempts to “unpack” key assumptions and concepts about gender in past research and policy on gender and energy in these sub sectors.⁶ Then, state-of-the-art conceptual frameworks are explored for relevance to future policy research on gender and energy. First, in **Chapter 2**, the sustainable livelihoods framework as adapted to the energy sector is analysed, and its contributions and limitations. Second, in **Chapter 3**, recent gender analytical approaches are examined: new gender and poverty thinking, and new gender and environment theoretical frameworks, including feminist political ecology.

Themes from these frameworks that could be analysed in future case studies on gender and energy are then suggested, together with some possible hypotheses for exploration of

⁶ Including the author’s own work, as one of the principle exponents of gender and energy over the past two decades.

gender-energy-development linkages. The analysis is focused on two questions of policy relevance:

- Is gender equality a key variable in the success or failure of energy interventions?
- Is improved access to energy a key variable in women's/gender empowerment?

CHAPTER ONE

Old directions: Approaches to gender in energy research and policy

Approaches to gender in development have evolved since the 1970 publication of Boserup's *Women in Economic Development*. In the 1970s and 1980s, the women-in-development (WID) approach sought to integrate women into existing development programmes. Increasing women's access to credit, land and employment through affirmative action, it was argued, would make programmes more effective and better able to meet their goals of growth and productivity. Thus both "equity" and "efficiency" rationales were used to justify intervention in favor of women. Later, the gender and development approach, rather than focusing on women in isolation, argued that it is important to understand the distinct culturally and socially defined roles and tasks that women and men assume both within the family and in the community. More recently, in the Millennium Declaration, an explicit commitment to equal rights and opportunities of women and men has been made, as a development goal in itself.

In the energy sector, these approaches to gender have not usually been explicit. Skutsch (1998) believes that the gap between gender policies as adopted in government and donor policy statement, and actual practice in energy planning, is partly due to lack of clarity by the energy sector in identifying which objective motivates attention to gender in an energy project – gender equality/empowerment of women; improving women's welfare; or increasing the efficiency of energy projects.

This chapter examines the historical evolution of early approaches to gender in energy research and policy in two subsectors as case studies: biomass energy, and labour-saving energy technologies. It attempts to "deconstruct" some of the assumptions and concepts about gender used in these approaches. How the crisis was "discovered", or the problem definition of the sub sector, is explored first. The view of women in the sub sector is then assessed. Finally, the approach to gender/women in policy interventions in the sub sector is analysed.

A similar analysis could perhaps usefully be applied to energy institutions (both national and international), and to macro issues in the energy sector, such as energy privatization, policy and planning, and global climate change. These are not addressed here, partly due to lack of time, but also because the history of gender and energy research in these areas is much shorter.

1.1 The “other energy crisis”: Biomass energy

Discovering the crisis in the 1970s

Following the oil crisis in 1973, energy policy and research suddenly became a separate discipline in both industrial and developing countries. Attention gradually turned not only to oil and electricity supply, but also to questions of energy pricing, fuel substitution, energy conservation, and alternative energy sources. Demand management and energy efficiency were identified as sources of energy savings, and energy balances were prepared to determine where in the economy energy was being consumed.

In developing countries, it gradually became obvious that much of the national energy balance consisted not of fossil fuels but rather of what became known as “non-commercial energy” or “traditional fuels” – wood, charcoal, animal dung, and crop residues freely collected and used by rural households for cooking and heating. In 1975, an influential pamphlet by Eric Eckholm of the World Watch Institute described fuel wood as “the other energy crisis.” Traditional biomass fuel use in developing countries was blamed for the massive tropical deforestation beginning to be identified by the nascent environmental movement.

Over the next decade, some energy analysts sought to bring a better understanding of biomass energy into energy sector thinking. It soon became apparent that basic data was severely lacking and could only be obtained through household surveys, which would always be location-specific and presented a number of measurement problems - not least the invisibility of biomass energy in the economy. By the 1980s, data had clarified this picture to some extent, to show that (Cecelski et.al. 1979; Barnett, 1982):

- About half of the world’s population cooked with biomass for all or some of their meals;
- For the poorest developing countries in Africa and Asia, as much as 90% of total energy consumption was by households and consisted of traditional biomass fuels;
- Most fuel collection by households was done by unpaid household labour of women and children;
- Biomass fuels were burned in open fires and primitive stoves, with low efficiencies;
- Biomass fuels were part of complex, inter-related agricultural, forestry, and even industrial production and use systems;
- Biomass consumption was not only by rural households, but also by urban households and small industries, and in many cases entered commercial markets.

The household energy sector was born, and a focus on the household as a unit of analysis. Despite this data availability, the energy sector absorbed these facts only slowly, and even today they are not always acknowledged in energy policy and practice. The invisibility of biomass energy and of the household energy sector continues to contribute

to unbalanced policy attention and energy budgets compared to their importance in many developing country economies (Peskin and Barnes, 1992).

Women and biomass energy

Attention to biomass energy, even if inadequate, opened the first window on women's roles in the energy sector. References began to appear to women carrying fuel wood, and the then-current women-in-development (WID) approach was applied to demonstrate the importance of women in the energy sector. The starting point was the gender division of labour: Women's roles in the energy sector were described, as users and collectors of fuel wood, and as victims of environmental deterioration and energy scarcity. Women were depicted in desert landscapes, carrying heavy loads of fuel wood and often accompanied by children, or squatting over primitive, smoky stoves. Women's everyday work clearly involved energy use and supply. Surveys suggested long hours for fuel collection and for cooking, with these costs in women's (and children's) time and effort increasing as deforestation worsened.

These daily responsibilities, it was argued, made women dependent on biomass energy supplies and vulnerable to changes in energy availabilities. They also meant that women had a special interest in conserving and managing energy resources. Thus, women's interests would be identical with, or at least complementary with, those of energy programmes and projects.

As time went on, the literature sought to document not only the burdens suffered by women as 'victims', but also women's roles as efficient managers of forest and fuel resources, knowledgeable about cooking properties of different species and fuel-efficient stove use and even stove building, as well as in tree planting and conservation of forest resources.

In common with most approaches to women in development at the time, the focus was almost completely on women (and sometimes children), with men and their energy activities virtually excluded from the picture. Little attention was given either to differences among women such as age, ethnicity, class and income; women were treated as an undifferentiated social group.

Policy interventions in biomass energy

These images of desiccated landscapes and women stooped over heavy burdens of fuel wood or smoky stoves elicited much concern from the development community. From a policy perspective, the main solutions to "the other energy crisis" in developing countries were proposed as:

- planting trees (reforestation) to provide more wood fuel; and
- introducing more efficient stoves for cooking, to conserve wood fuel..

Incorporating women in both forestry and improved cook stoves projects was attempted extensively in the 1970s and 1980s. Green, Joeques and Leach (1998) effectively critique the failure of forestry sector policies to involve women in projects ostensibly designed for their benefit.⁷ A similar critique can be made of early, and some later, attempts to involve women in improved cooking stove projects. This is an intervention of some interest here, since cooking is an area of obvious direct concern to women, and one where women's role has been acknowledged from the beginning. By far the majority of references and projects in the energy sector aimed at benefiting women continue to focus on improved cook stoves.

First steps: The Women-In-Development approach in improved cookstoves

Initially, the approach to the introduction of more efficient stoves was highly technocratic, with stove design in laboratories by (male) engineers. The potential benefits of more efficient fuel use in cooking appeared obvious: alleviating local pressure on wood resources, shortening walking time required to collect fuel, reducing cash outlays necessary for purchased fuel wood or charcoal, and diminishing the air pollution released into the environment. Frequently heard were arguments such as, "by doubling cooking efficiency, 50% less fuel wood will be consumed and deforestation decreased." Initially, it was believed that improved stoves were so superior to traditional cooking methods that they would simply be presented and people would adopt them. Women were portrayed as passive adopters, or sometimes as resistant to adoption due to "cultural" reasons, obstinacy or ignorance.

As stove programs nonetheless failed to achieve dissemination and use targets, a number of critiques pointed to the reasons for failure (Agarwal, 1983; Foley and Moss, 1983; Manibog, 1984). Most important was that the so-called "improved" stoves were not necessarily more efficient than traditional cooking methods, and neglected many of the subsidiary benefits of traditional stoves (such as heating, fitting different size pots and fuel, etc.). Efficiencies cited of 5-10% for traditional stoves were unrealistically low; while efficiencies claimed for improved stoves of 40-50% - which would in theory have decreased fuel consumption by up to five times - were unrealistically high, in actual field use conditions. By the end of the 1980s, even 25-50% savings in fuel consumption from improved stoves began to be considered very good in the stove community.

These failures drew attention to the role of women in the introduction of improved stoves, and the need for women's participation and consultation. It began to be recognized that among the factors determining efficiency of use of traditional stoves was the fuel use and management techniques of the user: some cooks could achieve higher efficiencies through e.g. selection and preparation of fuels, careful tending of the fire, use of pots, choice of cooking techniques, etc. There was a realization that women possessed a high level of "indigenous" or "traditional" knowledge about cooking that might be useful in stove design (Caceres, Ramakrishna, and Smith, 1989; Ki-Zerbo, 1980).

⁷ I want to acknowledge drawing extensively on many of the concepts of this Green et al review of approaches to gender in forest research and policy, which inspired this review of gender in the parallel household energy sector.

Acceptance of stove designs, it was realized, would not be automatic; stoves needed to appeal to consumers; those consumers were women and therefore their needs had to be addressed. More attention began to be paid to finding out what features of stoves appealed to women (types of pots to be accommodated, types of foods cooked, comfort, smokelessness, appearance, and so on), through surveys and focus groups. Measurement of stove efficiencies in actual field conditions and follow-up surveys on user acceptance became more commonplace. In some projects, women were involved in stove construction or in extension services to other women, on the assumption that women would be better able to communicate with other women. Guidelines for stove design and user involvement as well as for monitoring and evaluation of stoves programmes were developed and published (Joseph 1990; Klingshirn, Crewe and Karakezi, 1990).

In line with Women-in-Development (WID) approaches, the guiding principle here was for women to be incorporated fully into project activities. There were two arguments made for this. First, women would thus be able to benefit directly from forestry and cook stove projects. And second, the projects themselves would be more successful, since women played key roles in these sectors. Without women's participation, they might fail to meet their objectives. Women's groups were often selected as the appropriate vehicle for such 'community' energy initiatives. These principles were included in the forestry and energy project guidelines of a number of non-governmental organizations and donors, sometimes as a separate policy on women, sometimes as self-evident.

Direct benefits for women?

Even improved stove projects that were explicitly designed to include women's participation did not always succeed. An exhaustive comparative review of successful and unsuccessful projects by the World Bank in 1992 identified characteristics that would make for successful stoves projects (Barnes, Openshaw, Smith and van der Plas, 1992). Possible reasons related specifically to women or gender are not mentioned however. It is taken for granted for example that women and lower income groups would be the main beneficiaries, and the only importance given to gender roles is in relation to benefits expected from improved stoves, with no attention to any other social relations, women's status or access to income.

Financial and economic benefits from improved stoves are cited in this landmark study as mainly due to direct cash savings for the family or through freeing women's time that can be used to earn cash income or for other purposes. These savings in theory could be substantial, since several surveys have shown that up to 20% of urban poor income is spent on purchasing biomass energy in some cities. Comparisons of traditional and improved stoves samples in Kenya, Rwanda and Niger documented declines of between 2 and 8 per cent in average fuel consumption per capita, implying significant cash savings (Habermehl, 1994). Labour savings could be important in rural areas: a statistical study in hill areas of Nepal in the mid-1980s was able to show that increased fuel wood collection time corresponded directly with decreased time worked in agriculture and a higher overall workload for women (Kumar and Hotchkiss, 1988). So presumably decreased fuel wood collection time would have the reverse effect.

These calculations of benefits assumed however that women had control over the cash savings or income, or indeed command over their own labour use. They presume that the value of women's labour, whether paid or unpaid, and women's status and negotiating position within the household and community, was not relevant to stove adoption decisions. In reality of course this may not be the case. Another factor is that women's labour tends to be fragmented and integrated with other activities and with labour use of other family members – fuel may be collected en route to agricultural work or while herding. The use of family labour and cash is generally a complex process of negotiation and bargaining and related to status and perceptions of status of different household members. The price of stoves is cited in the 1992 study as a barrier to their adoption, but there is no discussion of women's ability to earn income, access to household income, or intra-household negotiation and decision-making.

Although decreasing women's workload in fuel wood collection is often mentioned, most biomass energy projects during this period – both forestry projects and improved cook stoves – primarily had an 'efficiency' rationale, along the lines of the WID approach. Involving women would help achieve the project goal of saving fuel wood and reducing deforestation (and more recently, global warming).⁸ It has been taken for granted that women's interests and those of improved stoves projects coincide, or at least are complementary. Indicators have typically included reduced fuel wood use or numbers of improved stoves disseminated. On the contrary, though, *there has often been an implicit conflict between the project goals* – usually benefits external to households, such as reducing fuel consumption and hence deforestation and, more recently, greenhouse gas emissions – *and women's own interests* in internal household benefits, for example, labour-saving, smokelessness, improved safety or time-saving. In both Africa and Asia, examples are cited of stove designs eliciting interest from women because they saved time rather than cooking fuel, while in other cases stoves have been rejected for requiring more time in fuel preparation or use (Leach and Gowan, 1987; Sarin, 1989). Such conflicts have often been at the root of problems with acceptance of stove designs.

Women's participation for project effectiveness?

Improved stoves projects have frequently benefited from woman's labour input, their experience as energy users and managers, and their knowledge about cooking practices, to increase returns to the project. Some stove designs have ignored women's labour constraints, requiring fuel to be cut in small pieces in order to fit in the firebox, or labour-intensive fire tending. The opportunity costs of women's labour have not always been considered, with women extension agents, stove builders, or women's groups expected to disseminate stoves without payment or with low wages.

⁸ The goal of reducing deforestation has persisted in many stove project documents, in spite of evidence that the local population's requirements for fuel wood usually play only a minor role in the destruction of forests, and that improved stoves are usually needed in rural areas to deal with the consequences of forest destruction from other sources (land clearing, urban demand, etc.) rather than their causes.

Furthermore, there has been only minimal participation by women at higher levels, in planning and management of stoves projects. Decision-making bodies such as energy planning commissions continue to be dominated by men, as does research on biomass and improved stoves, in both technical and economic areas. Men typically control higher-status and more remunerative commercial activities as well, for example it has often been noted that as soon as fuel wood and charcoal production and trade grow to be a profitable commercial activity, these activities pass from women's to men's control. Stove production has been dominated by male artisans, though there are some notable exceptions.

The gender dimension of land tenure and tree planting is highlighted well in Green et al (1998). Rights to tree products, including fuel wood, tend to be customary and unwritten. The example is cited in Kenya, where planting trees confirmed land ownership, hence women could not plant trees on land that they farmed on tenure; they could however plant woody bushes, which served the same purpose of fuel supply. A GTZ project took advantage of this finding and successfully increased household fuel supply. Bina Agarwal (1986) and others have documented the displacement of women's informal rights to fuel collection on communal lands, through privatization of communal lands for "community" forestry where proceeds are controlled by men or the elite. Similar displacement and privatization of communal collection rights to dung have been remarked upon in the introduction of biogas plants (Kelkar, 1981).

In addition, focusing on women and women's groups in household energy interventions presented women as a homogeneous group separate from men. It obscured the household bargaining and trade-offs based on power relations within the household. Largely ignored were men's roles in taking on tasks within household energy, such as fuel collection or purchase as fuel scarcity conditions change; providing funds and contributing to or making decisions about stove and appliance purchases; and insisting on food quality and its on-time delivery. Even where male migration is high or women are heads of households, remittances and decision-making by male relatives can play an important role in decision making about energy and appliance purchases. Women's status and involvement in commercial, income-generating activities also has played a role in their ability to influence household decisions about such purchases.

A new phase: Integrated household energy approaches

By the mid-1990s, disillusionment with the achievements of improved stoves projects had grown, and indeed donor funding for energy technical assistance generally had declined in developing countries. Priorities had switched from the privatization and economic growth orientation of the 1980s, to a mandate for poverty alleviation in development. Even before the energy sector overall had begun to respond to this call, the household energy community had begun to make linkages between its energy efficiency goals, and poverty alleviation: The 1995 HEDON publication on *Household Energy and Agenda 21* details the numerous benefits of household energy interventions for other development sectors.

At the same time, a more comprehensive view of household energy was developing – recognizing the household as a center of production and including not only improved biomass cooking stoves, but cooking practices, kitchen and housing design, and food preparation, as well as other fuel substitution possibilities and wood fuel supply and pricing policy issues. A specific multi-sectoral and institution-building approach was advocated as well, developed by the Household Energy Programme of the German GTZ (GTZ, 1997 and popularized in GTZ-HEP assistance throughout Africa). This approach emphasized the cross-sectoral nature of both the problems and their solutions and the need to involve many authorities, including those dealing with energy, forestry, agriculture, health, transport, urban planning, education, environment and industry. As a consequence, improved stoves projects have been increasingly integrated into other development sector activity such as forestry or agriculture, or into multi-sectoral projects.

Perhaps most significant in stimulating new interest in improved household energy sources has been the documentation of the magnitude of the health effects (mainly eye and respiratory illness) of indoor air pollution (IAP) from cooking with biomass fuels. Although the issue had been raised since the 1980s (Smith, 1993), in 2002 was this problem ranked the 4th largest health problem in developing countries by the World Health Organisation, and has attracted renewed interest in improved cook stoves from the health sector as well as the energy sector. At present, major efforts are going into quantitative technical studies to document the problem and link exposure with disease (e.g. Ezzati and Kammen, 2003). In this scenario, women are presented largely as the victims of indoor air pollution and household energy supply and use problems, with little attribution of women's own knowledge and agency.

Some recent studies are giving a more nuanced view of the household dynamics of exposure to IAP. Epidemiological studies in India, for example, have been complicated by the tendency of women to undervalue their own health and failure to report socially unacceptable diseases such as tuberculosis, as well as by the under-reporting of girls' illnesses (Mishra, Rethorford and Smith, unpublished). A recent study in northern India differentiated among women and showed that variables such as age and literacy were more powerful predictors of reported symptoms of IAP than factors such as income and location of cooking as expected (Parikh, Biswas and Karmakar, 2003). A report from Vietnam explicitly links not only IAP but also other health problems in Vietnamese kitchens to the low status of rural women (Hoai Duc and Thuy, 2002).

Certainly, there are a number of successful improved stoves projects (both charcoal and wood, and both urban and rural) in terms of mass dissemination. Still, it appears that many of the lessons of successful household energy programmes have not really been integrated into current programs in all countries, and increased funding for documentation of indoor air pollution-health linkages is not necessarily matched by the use of the successful approaches already learned in past improved stove programs. A recent evaluation of the National Program on Improved Stoves in India found that: although most women said that they were satisfied with their stove and valued its smoke-reduction qualities, still 20-50% of households had modified their new stoves to accommodate larger pots and pieces of wood; most women continued to use their

traditional chulha as well as the improved stove; many had only accepted the stoves because they had been led to believe that other benefits such as new roofs would follow; and few planned to purchase the improved stove once their nearly-free improved stove wore out (ESMAP, 2000; WII, 2001a,b). In one village, Muslim women had not been able to take the decision to make holes in roofs for chimney pipes, since the men were absent, so chimneys were installed that vented directly into the kitchen rather than outdoors. When the men returned, as expected, they were reluctant to allow the pipes to be installed through the roofs (WII, 2001b).

A particular difficulty with involving women effectively in household energy projects has been that, since the benefits for women have appeared self-evident, it has often been believed that no special analysis or guidelines were needed and that any project seeking to be effective would automatically take the necessary measures. While women are frequently identified as the main victims of the biomass energy crisis and the principal beneficiaries of improved stoves projects, policy and project approaches in household energy projects – whatever their goal – have seldom been differentiated by gender. No particular gender relations issues have been seen as attached to the admittedly different roles of men and women, so it was not considered necessary to distinguish between men and women in interventions – there should just be equal treatment. This approach has been taken to the point that in for example the 1992 review of improved cook stoves programs above, the authors talk about “people cooking on open fires”, “rural inhabitants produce and depend on biomass,” “close involvement of local residents,” “consumer preferences,” and so on, while refusing to draw any implications for policy or practice from the fact that the “people” and “consumers” concerned were female or male.

In one of the few gender analyses of a household energy program, in Namibia (Cecelski, 2002), indicators adapted from the World Bank water and sanitation sector methodology for participatory assessment (MPA) were used to assess gender integration at three levels: policy support for gender-sensitive participation; institutional support for gender-sensitive participation; and gender-sensitive participation and division of benefits at the implementation level in stove production and use. Men and women each had a distinct perspective on stoves and other issues in the study. This study found that even in a relatively gender-sensitive program, an explicit gender perspective could shed light on specific measures to improve both project effectiveness and gender equity. A gendered analysis to the Indian household biogas programme also yielded useful insights into gender differences in priorities, values and benefits (Dutta, Rehman, Malhotra and Ramana, 1997).

The lack of resources devoted to indoor air pollution has been cited as a sign of gender bias in the energy sector due to the fact that cooking is a major area of women’s invisible work and women are the main group affected (Parikh, Smith and Laxmi, 1999). Others have pointed out even attention to stove improvement can be a “comfortable” way for the energy sector to marginalise women to their traditional domestic and reproductive work, while ignoring women’s productive and decision making roles in e.g. traditional fuels production and trade, not to mention gender issues in non-biomass energy use and rural electrification as well as macro-economic energy policy issues. For example, in forestry

projects, men have often been involved in forestry activities while women have been relegated to stoves activities.

Even more fundamentally, focusing on stoves in isolation (for example to address indoor air pollution) risks missing other important aspects of gender and poverty. Madhu Sarin (1986) describes why her Indian non-governmental organization decided to shift their focus from stoves to rehabilitation of village common lands:

Unorganized, underprivileged rural people are being deprived of their access to and control over local natural resources, which are being transferred on a highly subsidized basis to the more powerful and organized urban/industrial groups. Attempts to deal with the domestic energy issues in such areas through partial interventions such as the introduction of improved stoves makes little sense unless the larger processes are also taken into account.

1.2 The real rural energy crisis: Women's time

Discovering the crisis

In the early 1980s, a reaction to the focus on biomass energy in rural energy needs in developing countries emerged from the gender and development community. Rural energy needs in developing countries had initially been identified as:

- *first*, fuel for cooking and heating, and
- *secondly*, mechanical or muscular energy for producing and processing crops and for basic survival.

Yet in the 1970s, rural energy needs had come to be identified with biomass fuel needs alone (to be addressed through the two solutions already mentioned above: planting more trees, and introducing new designs for more efficient stoves). By the early 1980s, it was clear not only that these two interventions were not always benefiting women, but also that women's energy needs were broader and more complex than improved stoves and woodlots.

Some gender experts, notably Irene Tinker already in the late 1970s,⁹ began to argue that *women's time*, not biomass energy, was the "real energy crisis". It was women's long and drudgerous workday that constrained their participation in forestry and improved biomass projects, as well as development in general. Providing improved mechanical energy sources (including renewable energy) to replace muscular human energy, was therefore advocated as a major priority.

These arguments were buttressed by time allocation studies that were becoming available in the late 1970s and early 1980s. Time use studies had been used before to justify sectoral time-saving interventions, by measuring the time used in specific activities such as agriculture, water collection, transport or food processing. In the energy sector, information on time in fuel collection was often used as an indicator of fuel scarcity. Many studies looked only at women's time use, and neglected men's. Gradually however some more detailed time allocation studies of the work of women, men and children became available, often carried out by farming systems researchers, anthropologists, and demographic analysts. One of the most comprehensive studies was done by anthropologists in eight ethnically representative regions of Nepal (Acharya and Bennet, 1981). In 1979 one of the first (and only) time allocation studies by an energy researcher was done, by ASTRA in India (Reddy et al, 1980).

These studies revealed a complex and rich picture of labour allocation in rural areas. They showed that women worked longer hours compared to men, but that much more of their work was unpaid. Time use studies showed considerable diversity in the division of labour between men and women, but that still certain tasks, such as weeding, child care,

⁹ Tinker's "The real rural energy crisis: women's time" was published formally as a book chapter in 1990, but various earlier versions were circulating in the energy community from 1979.

cooking, fuel collection, food processing and water carrying, were typically done by women, while other tasks such as ploughing and home repair, were usually done by men. Other tasks were frequently shared or varied between men and women. Time use studies documented women's important role in agriculture, with the majority of food production in Africa estimated as by women.

Water and fuel collection were shown to vary by location, season and terrain, in arid areas taking up to 3 hours daily per household. Distances traveled could be 10 km or more. Rural transport was recognized as a significant task, with 80% of all transport in Tanzania performed by women. Food processing was revealed as drudgerous and time-consuming, with e.g. 84-150 woman hours per week seasonally used in shelling 600 kg maize in kenkey production in Ghana, and 110-220 woman hours using mortar and pestle to dehusk 1100 kg of rice weekly in Sierra Leone (Ahmed, 1985).

These and other time allocation studies made clear that far more time was spent by women, in most parts of the developing world, on food processing and cooking than in fuel collection. Water collection, agricultural work, and load carrying were also major uses of women's time. Indeed, as Tinker points out, even in some of the supposedly most degraded areas where stoves programs were advocated, such as around Ouagadougou, Burkina Faso, and in Nepal, time in fuel collection was low compared to time spent in other productive and household activities. From a poor woman's perspective, reducing time in fuel collection might be less of a priority than reducing time in other, more time-consuming activities, food processing in particular.¹⁰

Applying gender analysis to labour allocation in the energy sector made women's roles more visible. A number of studies documented not only women's work in energy, but also the effects of fuel scarcity on women's work and family welfare. Women were portrayed in a major ILO research program as the hardest hit victims of the rural energy and environmental crisis, with increasing time and effort devoted to fuel and water collection, as well as decreasing soil productivity and male migration, leaving women with little choice but "to work more (and to use child labour to help them), cut down on family living standards and try to squeeze more output and income out of the land, thereby often contributing to the destruction of the ecological base - a vicious circle"(Cecelski, 1986 and 1987). Nutritional and health impacts and loss of access to minor forest products (FAO, 1987) were documented in a "basic needs" approach. Such studies contributed much evidence to the WID documentation of women as victims of environmental degradation and fuel scarcity.

Women and labour-saving energy technologies

The energy community faced a number of difficulties in deciding how to respond to the demand by gender experts to address rural women's time constraints. Solutions to the nexus of the gender-mechanical energy problem were not as clear-cut as for the biomass

¹⁰ It is ironic that Tinker's oft-cited table on time use has frequently been used to show women's burden in fuel collection, when indeed the time spent in this activity shown in the table is low compared to food processing.

energy crisis, however, and were not necessarily perceived as falling into the energy sector at all.

Central to the issue of labour saving was how to deal with human energy in energy analysis. There was debate on whether human energy could be measured and included in energy balances at all. Energy analysts were uncomfortable with comparing inanimate energy sources such as petroleum and coal with metabolic energy expended by humans and animals.¹¹ Methodological problems were cited: caloric energy expenditure varies according to a multitude of variables, including body weight, tools, loads, terrain, etc. Was it even ethical to compare human energy with inanimate fuels? Some attempts had been made by health and nutrition researchers to measure energy expenditure for different tasks, in order to determine the most energy consuming tasks and seasonal variations, often in relation to food consumption. Some energy analysts used caloric expenditure on different tasks in order to compare the relative importance of human and other energy sources. In the end, this work was not really taken up by the energy community.

The invisibility of women's work was not unique to the energy sector, of course. The pioneering analysis of women in development by Boserup (1970) early on had pointed out the under-reporting of women's subsistence activities. Insights into "unpaid family labour" and informal production came from labour market analysis in the 1980s, though, as labour market economists began to realize that ignoring these gave a misleading picture of their real economic importance and thus could result in incorrect policy. In the 1980s, the ILO recommended that the definition of "labour activities" in labour market censuses cover not just wage-earning activity, but also production and sale of economic goods and services - and even subsistence and domestic activities..

The under-valuation of unpaid family labour in most labour market analysis was seen as particularly damaging to women in developing countries, since the new surveys showed that two-thirds of women's work was devoted to unpaid household or community activities, while only one-third was spent in economic activities recorded in the market. Men's work activities - three-quarters of which were in the market - received a larger share of cash income and recognition for their economic contribution. In 1995, UNDP estimated that if unpaid activities were treated as market transactions at prevailing wages, global output would increase by US \$16 trillion, of which US \$11 trillion would correspond to the non-monetised "invisible contribution of women" (UNDP, 1995).¹² These findings were highlighted in numerous high-level publications and conferences, including the Fourth World Conference on Women in Beijing, and began to draw more attention to women's non-market labour.

¹¹ Though this was not a new problem for the energy sector - measuring and accounting for non-marketed traditional fuels posed similar measurement difficulties, and was gradually recognized as an important reason for the lack of attention to traditional fuels in national energy policy. Yet methods have been found.

¹² The remaining \$5 trillion would consist of the non-monetised contribution of men.

Drawing on such findings, women and energy researchers pointed out that women's survival tasks, with the exception of cooking and fuel wood collection, were largely invisible in energy balances, despite the fact that they would have market values and be supplied by commercial energy sources in the modern sector:

... an electric pump that transports water uses energy, but a woman carrying water does not. A water mill grinding grain falls within the energy sector, but a woman doing the same task with mortar and pestle does not. Trucks transporting crops are consuming fossil fuels, but women head loading crops walk outside the energy balance.

- Cecelski, 1995

Other examples were given to show that household production received less budget attention than its actual value deserved. For example, new energy technologies for irrigation pumping, primarily men's domain, were cited as receiving far more energy policy attention than those for pumping and transporting drinking water, almost exclusively women's work. Similarly, alternative and cheaper liquid fuels for automobiles – used and owned more by men in most countries – it was pointed out, had been much more promoted than had ways to improve pedestrian and public transport, where women were over-represented. Parikh and Laxmi (2000) compare the share of petroleum transport fuels (55%) in total petroleum imports to the share of kerosene for cooking fuel (19.3%) and speculate that the fact that adequate kerosene is not available even for households who can afford it indicates the low priority placed on the cooking fuel needs of women.

In general, though, these considerations did not reach the macro-level in energy policy research, and the focus remained on the rural, household level, and the measurement and documentation of women's burdens and victimisation.

Policy interventions in labour-saving energy technologies¹³

Appropriate technology (AT) enthusiasts were the first to address women's labour-saving needs specifically, and indeed were at the origins of many technologies that were later grouped into renewable energy, such as wind energy, solar cookers, biogas digesters, and solar home systems.¹⁴ Women's specific interests and needs in appropriate technology were highlighted in the "Tech n' Tools" special exhibition at the First UN Conference on Women in Nairobi in 1985. The focus in AT projects was on common women's tasks, seeking to improve both rural and urban women's productivity, income and health

¹³ Andrew Barnett (personal communication, 9 March 2004) argues for "productivity improving" rather than "labour saving" technologies. Labour saving is used here because the term is ubiquitous in the literature on women and technology. However this may very well be due to an incorrect view of women's work as non-productive.

¹⁴ It is sometimes forgotten that the subtitle of *Small Is Beautiful*, the famous 1973 book by the founder of the AT movement is *Economics [not Technology] As If People Mattered*. Schumacher did not distinguish between men and women in his analysis, but he did emphasise lightening the burden of work and raising productivity, not just "saving" labour. He was also concerned with the loss of employment due to the use of capital-intensive technology.

through the introduction of time- and effort-saving technology. Technologies to improve women's agricultural work (e.g. weeders) and non-farm work (e.g. improved spinning and weaving technologies) were introduced, but the main focus was on technologies to improve women's repetitive, unproductive household tasks, such as water supply, grinding mills, improved stoves, and transport devices (Carr and Sandhu, 1987).

The early stages of women and appropriate technology development were similar to the experience already recounted with improved stoves programs: The failure of a technology-based approach to benefit women and successfully disseminate "appropriate" technologies led in some cases to more consultation with women themselves and the recognition of the value of adaptation of traditional technologies and drawing on indigenous knowledge. Developing a process to assist women to gain access to new technologies, and overcoming the constraints of limited access by women to credit, capital, skills, extension and organization then became the challenge. A major motivation - especially in Africa - was to release women's time and effort from domestic chores, so that they could devote more time to food production or cash earning, and thus improve the nutritional status of their families (Ibid.). The question of financial sustainability later became central, and it was hoped that *either* domestic technologies would release time for women to engage in different, more "productive" activities, *or* that improved technologies could be used (perhaps through women's groups) to generate income to pay their costs.

As gender and technology developed as an applied sub-field in itself, the focus broadened to examine inequalities in male and female access to education and careers, the unequal attention given to men's and women's tasks in technological change, and the recognition of women's as well as men's indigenous knowledge. International conferences by GASAT and UN reports in the 1990s argued for a shift away from the then-current view of women only as passive recipients of science and technology and attempting to get more women into mainstream science and technology as it currently exists. Rather, it was argued, women should be recognized as active participants in the innovation process and their values incorporated into mainstream practice, shifting it to benefit the masses of people more (UNIFEM, 1993; Gender Working Group, 1995).

As time went on, women's labour-saving needs were more often analysed and addressed in other sectors rather than energy: Indeed, it is doubtful whether the gender and technology paradigm has really ever been applied to energy technologies. For example, gender analysis is now routinely applied in sectors such as water and sanitation, and agriculture. The water and sanitation sector developed a gender-sensitive and participatory model, with saving women's time as an important indicator of success. Analysis of rural transport by gender showed the major role of women in head loading and addressed their unequal access to transportation technologies (Fernando, 2002). Women's agencies such as UNIFEM and INSTRAW became active in promoting labour-saving technology projects for women in the 1980s, and national women's organizations, such as AIWC in India and WAD in Namibia, continue to pursue such efforts, often in collaboration with local appropriate technology institutions and independent of mainstream energy sector activities.

The impact of new technologies and modernization have been a continuing theme of research on women and technology. This literature has focused especially on agricultural modernization. Generally, these impacts have been perceived as negative, beginning with Boserup's (1970) delineation of the negative effects that colonialism and the penetration of capitalism into subsistence economies have often had on women, resulting in their loss of status and rights to land, and creating a productivity gap between women and men by introducing modern technology and cash crops to men rather than women, in line with European concepts (Beneria and Sen, 1981). Although effects of technological change on the position of women may in theory be positive or negative, the empirical evidence is largely negative according to Whitehead (1985). The best-documented case was the introduction of mechanized rice hullers in Java, in Indonesia, and in Bangladesh in the early 1970s (**Box 1**).

Box 1: Differential impacts of mechanised rice milling on categories of women in Java, Indonesia, and Bangladesh

In the early 1970s, mechanised rice production was introduced in Java, Indonesia, in an attempt to modernize agriculture and increase rice production. High yield varieties, the tebasan harvesting system, use of sickles and scales contributed to a package that created labour displacement, especially among poor rural women. By 1978, only an estimated 10% of rice was being hand-pounded, for family consumption. Estimates of jobs lost ranged as high as 1.2 mil in Java alone and as high as 7.7 million in all of Indonesia as a result of the introduction of the new technology. Collier estimated that the loss to laborers in earnings due to the use of hullers was US\$50 million annually in Java, representing 125 million woman days of labor. The shift from a traditional technology to a more modern one eliminated one of the more important sources of income for landless villagers. It is difficult to call the rice mills a "mistake", because they enabled increased rice production and eliminated an arduous task for women. However the result was to worsen the problem of unemployment and income distribution in Java (Cain, 1985).

In Bangladesh, an estimated 5 to 7 million workdays of productive employment per annum for rural women were estimated displaced by the spread of steel rice hullers in rural areas. Three categories of women were differentiated by Scott and Carr (1985) as to impacts. For female members of large surplus farms, the change in technology was generally beneficial, since they no longer had to supervise hired female labour operating the "dheki", so they had more leisure time and their families saved economically with cheaper milling costs. For female members of subsistence farms, the benefit was relief from the time-consuming and physically demanding labour of operating the dheki, but this depended on obtaining cash to pay for the milling costs. The category of women that experienced negative impacts was the poorest 5%: wage-labour women from landless families who did dheki work which provided an estimated 55% of their annual income.

Research on the impacts of agricultural modernization on women and men continues to show both positive and negative impacts on women (Kolli, 1997; Arya, 1998). However, as in the Java and Bangladesh cases, the impacts are not uniformly negative: Women in landholding households, or with the capital to invest in new technologies or new trade, have been able to take advantage of new technologies and benefit from them. Landless, poor women on the other hand have simply been displaced from employment or had their domestic workloads increase due to changes in the social relations of production. Research on adoption of women-operated treadle pumps for irrigation in Bangladesh show similar differentiation of impacts between landless and landed women (Palmer-Jones and Jackson, 1997).

There has been little differentiation in most gender and energy technology research of impacts on different groups of women. But the question of differential impacts on men and women has sometimes been addressed. As early as 1981, Hemmings-Gaphan suggested that village solar water pumps would change relations between male herders and women, mainly benefiting herders by alleviating the work of drawing water for animals while women's main effort in transport of drinking water would not be affected; but conflicts between the two might be eased by concentrating the herders on the solar pump. Recently some project interventions have tried to strengthen the position of women vis-à-vis reaping benefits from labour-saving energy technologies: In Mali, the multi-purpose diesel platform project has insisted that since the labour-saving needs addressed were primarily women's milling and grinding, energy equipment and assistance should be provided only to women's groups, in order to counterbalance the low level of asset holding by women generally in the country. The project has nonetheless also involved men in benefits in distinct ways fitting cultural norms (Burn and Coche, 2001).

For the energy sector, the main congruence with women's labour-saving needs has remained improved stoves and fuels. Women's principle interest in energy has still usually been perceived as saving labour in fuel collection, and hence in reducing wood consumption.¹⁵ Nonetheless, as donor interest and funding for rural electrification and renewable energy has revived in recent years, claims have been made for their time- and effort-saving benefits for women have been made, too. Women's interest in saving labour has also been assumed to be identical or complementary with the goals of these energy interventions. Benefits of rural electrification and renewable energy for women have largely been simply presumed by proponents, while the suggestion of possible negative impacts of these new energy technologies on the position of women, has been viewed as absolutely far-fetched.¹⁶

¹⁵ Perhaps surprisingly however - since the burden of fuel wood collection on women has been so dominant in the literature - little attention was given to improved technology for the collection and transportation of firewood (Bryceson and McCall, 1997; Cecelski, 1992).

¹⁶ A typical reaction was that of the astonished senior energy expert at a UNDP expert group meeting a few years ago, who in response to a presentation by this author on gender and renewable energy (including possible negative effects on women), whispered to me, "It's difficult to believe, if what you are saying is true, that would have significant implications for our work!"

*Rural electrification*¹⁷

The impact of rural electrification on development has for years been the subject of lively debate. In the 1970s, the need for rural electrification was perceived as obvious, and subsidies justified by the unqualified benefits expected for all. Rural electrification was expected to increase incomes and improve family welfare. By the 1980s, several studies had raised doubts about causal linkages between rural electrification and income, employment, poverty alleviation, education and health, with the evidence showing the need for complementary inputs in order for electrification to have an impact. Concerns were also being put forward about the growing financial insolvency of many utilities, trying to expand grids through unfunded subsidies. As a result, international development assistance subsequently declined in the 1990s, and state utilities sought to attain financial viability by targeting more densely populated areas, privatization and structural reform.

With the large numbers of still unserved households in rural areas, developing countries became a major market for solar home systems in the 1990s. At the same time, more financially sustainable approaches to both grid extension and solar home systems sales began to be implemented, based on new models that emphasised ability-to-pay as the main criteria, sometimes accompanied by the extension of credit. Electrification is now starting to be recognized as a key element in a synergistic infrastructure package supporting economic and social development. But success continues to be measured by utilities largely in terms of numbers of households or units electrified.

Gender issues have rarely been mentioned in the mainstream literature, except to list benefits assumed for women. Disaggregation of participation in rural electrification and its benefits by gender has seldom been done, and indeed there are relatively few socio-economic impact studies available at all. Women have been depicted, if at all, as happy beneficiaries of rural electrification.

Just as many rural electrification systems in developing countries adopted inappropriate and costly Western design standards for distribution systems, benefits attributed for women were often predicated on Western models of women spending more time in the household and using labour-saving electrical appliances. Since it was assumed that women spent more time at home, household electrification lighting would assist their work. This ignored not only women's work time away from home, but also the fact that as a result of men's dominant role in household decision making, lighting was often placed conveniently for men's needs rather than women's, and rarely in the kitchen, which, though the central place for women's work, was frequently separate from the main house. Cultural prohibitions on cooking and entertaining in the same room influenced, with men's interest in entertainment uses often winning out. Furthermore, household decision-making and access to income affected the ability of women to use

The picture presented in the resulting expert group report however focused on benefits for women of renewable energy.

¹⁷ Rural electrification includes both grid extension and decentralized generation, whether using fossil fuels or renewable sources of energy.

electric labour-saving appliances, with the most common appliances purchased following electrification (after lighting) being TVs and radios rather than stoves, irons, washing machines or vacuum cleaners. Other benefits of rural electrification posited, that were related to women's roles, included reduction in population growth and reducing deforestation (a particularly mystifying connection, since electric cooking and heating in rural areas, though desired and practiced to a limited extent, has never been common).

Some of the benefits of rural electrification that were documented raised further questions. For example, improved lighting was at first seen as a benefit primarily for reading and general convenience. Later, it was found to extend the working day and allow women and men to work longer in agriculture (because meals could be prepared after sundown), or engage in home-based industries in the evening. But the effects of such an extension of the day on women's other work, sleep, energy expenditure, and health have not been explored.

Recently, some un-noticed indirect benefits for women have come to light: for example, by providing lighted streets and outdoor lighting around houses, female travel to meetings and school might be safer. In Tunisia, access to media with rural electrification appears to have increased women's knowledge about their legal and political rights (Chaieb and Ounalli, 2001), and surveys in India show that women in electrified households read more and collect fuel wood less than in unelectrified households (controlling for income), though the causal mechanism is speculative (Barnes and Sen, 2003).

Another approach, followed by the ENSIGN project in eight countries in Asia, was sponsored by development banks and assisted by energy experts, but without targets for specific energy technologies; indeed the majority of assistance proved to be used for wiring and grid connection (Raman, 1998). This approach enjoyed an unexpectedly high response from women entrepreneurs, perhaps because they could select the most appropriate energy source for their work regimes and needs.

Attempts to involve utilities themselves in ensuring benefits for women have been difficult, since utilities generally lack the skills and capacity for time-consuming community participation (James, 1998). More successful has been state insistence on integration of rural electrification into multi-sectoral regional development planning, when this included a mandate and infrastructure for women's participation (Cecelski, Ounalli, Aissa and Dunkerley, 2001).

In South Africa, women's involvement in rural electrification has received specific attention, due to the equity mandate of the post-apartheid government (Energy & Development Research Centre, 1998); but while women's visibility has been raised, the extent of actual benefits is still not clear (Annecke, 2003). Women remain under-represented as decision makers and professionals in the electricity sector.

Renewable energy

Renewable energy covers modern energy technologies based on solar, wind, biomass, geothermal and small hydropower; it often refers to traditional biomass as well. Most renewable energy literature has looked at supply side options, comparative costs, resource potentials, environmental and social benefits, research and development, commercialization and technical performance. In the 1970s and 1980s, development assistance agencies attempted to promote small-scale renewable energy technologies, mainly technical demonstrations. As with many other “appropriate technology” efforts,

Many projects were considered failures because of poor technical performance, and poor suitability to user needs and local conditions (stemming from lack of involvement of relevant stakeholder. Projects lacked institutional and commercial viability. Most funding was for equipment rather than recurrent costs or technical and managerial skills (Martinot, et.al. 2002).

By the late 1980s, “donors had become disillusioned and aid recipients had come to view renewables as second-class technologies that industrialized countries were unwilling to adopt themselves.” Some developing countries persisted however, and a number of success stories can be mentioned.¹⁸ The Rio Summit in 1992 and the involvement of multinational companies brought new funding and interest in market-oriented approaches to renewables.

In 2002, the *Annual Review of Energy and Environment* published a state-of-the-art review of renewable energy markets in developing countries. The Martinot, et.al (2002) review is important both because it marks the shift of renewable energy from the fringe to the mainstream of sustainable development, and because it is the first to offer a truly demand-oriented perspective on renewable energy technologies. It is organized around end-uses, not technologies, and reviews renewable energy for rural residential and community lighting, TV, radio and telephony, for rural small industry, agriculture and other productive uses; for grid-based power generation; for residential and commercial cooking and hot water; and for transport fuels. It discusses impacts on rural development, affordability, consumer credit, and sales versus rentals, equipment subsidies and market distortions; rural enterprise development, financing and business viability; policies and financing for private power producers; and market facilitation organizations. The authors suggest a needed paradigm shift from technology assessment to market assessment, and from donor aid to sustainable markets.

Women however are viewed in this state-of-the-art report, as in most previous reports on renewable energy, primarily as *beneficiaries* of renewable energy projects. Benefits cited

¹⁸ Some developing countries were pursuing their own renewable energy programmes: e.g. China (biogas for household lighting and cooking), India (biogas and grid-connected wind power), Brazil (ethanol for transport) and Nepal (small hydropower). The market for solar home systems in Kenya and the success of solar hot water heaters in several countries became known, though still there were far more failures (Martinot, et.al., 2002)]

include spending less time and labour for fuel wood collection and cooking in Nepal; weaving mats at night in south Africa; and wind generator-operated appliances improving living conditions and saving time for women in Mongolia. Secondly, women's participation is seen as *contributing to the success* of renewable energy projects, through women entrepreneurs (community solar-powered cell phones operated primarily by local women villagers in their homes in Bangladesh) and women's organizations in India and Vietnam facilitating contacts with women. The Vietnam Women's Union is cited as helping to promote renewable energy by offering consumer credit for solar home systems and demonstrating SHS at health camps.

No gender lens is used to analyse reasons for success or failure however – probably due to the absence of this kind of analysis in the majority of the renewable energy literature. Gender relationships that affect benefits, participation, and access are not mentioned. Women remain largely invisible, in “people,” “households,” or “communities.” Implicitly, women's views will be taken into account in renewable energy projects under the general category of “users”. A unitary model of households and communities is assumed, with no diverging interests between men and women. Women are assumed to be a homogeneous and largely passive, benefits-receiving group.

Explicit efforts to include women have been undertaken recently in some solar home systems projects, by providing credit through women's banks or women's organizations (Sengendo, 2001). These initiatives enjoyed limited success, because women apparently did not consider the technology or the credit terms attractive enough to justify the expenditure. Even SHS projects that have consciously tried to target women (but without a gender strategy) have encountered difficulties in recruitment, retainment and overcoming obstacles to female entrepreneurship (Smith, J., 2000). A few projects have trained women at home to maintain solar home systems, recognizing their interest and capacity to keep systems going.

While these efforts at least have increased women's visibility in the sector, the focus still seems to be an efficiency rationale for including women in renewable electrification – offering women credit, or training them to do repairs, would help sell more solar home systems. Put simply, projects would benefit from women's capital and labour inputs, to meet their targets. Little consideration is given to women's time and labour scarcity, or opportunity costs of their involvement. This perhaps accounts for the low level of response by women.

Indeed, the different implications of the wider use of renewable energy for women and for men have still hardly been examined. Research and project reports on renewable energy rarely include gender-disaggregated information. Actual impacts in terms of labour saving, income, etc. of new energy technologies on women's lives are usually merely assumed. Gender differentials in poverty are seldom discussed in renewable energy policy, even though they influence the potential for women's involvement. Questions of control of land, labour and benefits; effects on different family members' time use and other family responsibilities; differential access to credit and information' organization; local knowledge and participation; and skills and training from a gender

perspective have not generally been seen as relevant to dissemination and commercialization of renewable energy.

Conclusion

A historical review of approaches to gender in two energy subsectors – biomass energy and labour-saving energy technologies – shows that gender and energy analysis as well as project planning and policy have remained largely within a women and development (WID) framework. Women first became visible in the energy sector in the 1970s as victims of the “rural energy crisis.” Improved stoves projects initially treated women as passive beneficiaries. Later, women were seen as contributors to meeting targets for stove dissemination that would reduce deforestation. Women’s own agency, and gender relations (as opposed to gender roles), were largely ignored. There has been minimal participation by women at higher levels in planning and management of stoves projects. It is not clear that recent renewed interest in household energy - as a multi-sectoral intervention and to address indoor air pollution and health issues - has necessarily incorporated gender issues or other lessons of earlier practice.

By the 1980s, the gender and development community was using time allocation studies to argue that the “real energy crisis” was not biomass fuel but rather women’s time and drudgery in the subsistence economy. The energy sector was unable to incorporate human energy and women’s invisible and unpaid labour into its analysis though. Labour-saving technologies in household tasks such as water supply, grinding, and transport emerged in appropriate technology (AT) and later, mainstream projects in the water and other sectors, rather than in the energy sector. Gender and technology paradigms and approaches to gender analysis (e.g. the differential impact of new technologies on women and men) were never really applied much in the energy sector, while they have become routinely applied in e.g. the drinking water sector. Benefits for women of both grid rural electrification and renewable energy for women have been simply presumed - while negative effects have been considered too far-fetched to take seriously. More recently, women and women’s groups have been viewed instrumentally, as possible contributors to dissemination of renewable energy technologies. How rural electrification could contribute to poverty alleviation and gender equality has begun to receive more serious attention.

Hence, the main focus on women in these two energy subsectors in the past has been to contribute to the “efficiency” of energy services delivery. This approach may be at odds though with the new adoption of gender equality, as well as other poverty alleviation targets, as goals in their own right in development thinking.

CHAPTER TWO

New directions: Energy, poverty and gender in a sustainable livelihoods framework

Energy, poverty and gender inter-linkages have begun to receive considerable attention at the turn of the millennium, especially as development assistance focuses on the Millennium Development Goals and the energy sector seeks to link to multi-sector development. This section reviews current conceptual analysis on energy, poverty and gender – notably, attempts to put these in a sustainable livelihoods framework – and comments on these efforts from a specifically gendered perspective.

Energy, poverty and gender have been explicitly linked in a sustainable livelihoods framework in several recent research papers:

- First, the China case study carried out by the Institute of Development Studies (IDS), University of Sussex, UK, under the World Bank EnPoGen project, has attempted to integrate energy into a poverty framework, with attention to gender (IDS, 2003).
- Second, a DfID-sponsored report (Clancy, Skutsch and Batchelor, 2003) focuses on gender in seeking to bring energy into poverty and sustainable livelihoods discussion.¹⁹
- Thirdly, a UNDP (2001) project has carried out a series of case studies on projects involving women in sustainable energy development.

Although they address different groups – the first, researchers, the second, planners, and the third, donors – taken together, these three research outputs provide a good overview of the state-of-the-art in conceptual thinking about energy, poverty and gender in sustainable livelihoods

¹⁹ Another DfID-KaR research project is currently using the sustainable livelihoods framework to explore the impact of energy use on poor urban women and girls' livelihoods in Arusha, Tanzania (Meikle, 2003).

2.1 Energy, Poverty and Gender: A Review of the Evidence and Case Studies in Rural China²⁰

The China study is one of several pioneering research initiatives undertaken by the World Bank to better understand linkages between energy (primarily electricity), poverty alleviation and gender equity, under what is known as the EnPoGen project.²¹ The main emphasis is on poverty alleviation questions, but the implications and impact of energy access on gender equity are prominent, and these are the focus of the present analysis. While electrification is the principle subject of the report (in spite of the title), the framework and many of the observations are of interest for the energy sector in general.

The discussion of gender in the report “takes as its starting point the empirical fact that women and children form not only the majority of poor people in most communities in developing countries, but are universally the major users and suppliers of energy resources in marginalized households.” It argues that the focus on productive (often male-dominated) energy services has neglected the complementary nature of productive and reproductive activities in rural households, which leads to energy interventions that are not only gender-biased but also less effective in terms of poverty reduction.

Drawing on the EnPoGen background issues paper (Cecelski 2003) and a UNDP briefing paper (2000), the IDS report notes specific gender-related issues:

- Disaggregated data (for example, on needs, uses, and technologies), are of considerable importance because the different and unequal roles in the division of labour mean that women and men have different needs and priorities, and these are reflected in their different energy needs.
- Given the importance of energy end use in determining impact, women’s energy needs will not be met until they have a “voice” in determining options and priorities.
- In order to improve women’s access to the energy services they need, programs will need to address their unequal access to the necessary “livelihood assets,” including credit, extension, and training.

²⁰ Institute for Development Studies (IDS), *Energy and Poverty: A Review of the Evidence and Case Studies in Rural China*, Report to the World Bank (2003).

²¹ The Energy, Poverty and Gender initiative (EnPoGen) was carried out between 2000 and 2003 by the Asia Alternative Energy Program (ASTAE) of the World Bank. The objective was to improve the World Bank’s rural and renewable energy projects through gaining a better understanding of their impacts on poverty alleviation and gender equity. Three case studies were supported, in China, Sri Lanka, and Indonesia; a methodology for monitoring and evaluating the impacts of rural and renewable energy projects on poverty alleviation and gender equity was developed; and several synthesis reports prepared. The author of this paper wrote an initial background paper for EnPoGen and also participated in the peer review group for the case studies. A special issue of ENERGIA News disseminated findings and a CD-ROM.

IDS notes that the above papers focus dramatically on the lives of individual poor women, but that “an approach centred on individual women and their burdens does also have some limitations.”

The research emphasizes three ideas in the energy supply and use system that are key to the problem statement for the research:

- the complementarity of (energy and other) inputs,
- the choice of end-use technology, and
- the division between reproductive and productive outputs.

Lack of adequate energy sources (both fuel and labour) is seen as contributing to a “vicious circle” of poverty, while provision of energy could reverse this into a “virtuous circle” (see figures in **Annex 1**). “Energy poverty” is defined as: “The inability to buy improved energy supplies or equipment result[ing] in low productivity, low quality of outputs and an inability to release reproductive labour for economic activity leading to low returns to investment and labour inputs, again limiting possibilities for energy investments.” (p. x)

After a review of energy, poverty and gender, several possible analytical frameworks for the exploration of energy, poverty and gender links are considered by the IDS team. The framework of research questions adopted builds on two existing frameworks, drawing together the Sustainable Livelihoods (SL) approach²² and the World Bank’s Poverty Reduction Strategy Paper (PRSP) framework²³. Both of these are acknowledged to be still under development and not fully adequate for dealing with either energy or

²² The Sustainable Livelihoods (S.L.) framework promoted by Chambers and Conway (1992) as adopted by UK-DfID and UNDP comprises three elements:

- human capabilities (education, skills, health);
- access to tangible and intangible assets (both financial/capital assets, and “social capital” of services, information, kinship and community and political networks); and
- economic activities.

S.L. focuses on households but “looks both outwards, to examine the relationships between households, community organizations, local government and other actors; and inwards, to examine intra-household relationships for example between men, women, children and the elderly.” (IDS, 2003)

²³ The PRSPs were launched as part of the World Bank’s Comprehensive Development Strategy in 1999. They were influenced by the S.L. approach and language (IDS, 2003). The approach has 3 components:

- empowerment (empowering the poor to address inequalities, including gender inequalities);
- security (addressing risk and vulnerability through safety nets); and
- opportunity (sustained economic and human development including the poor).

The IDS report sees more emphasis in PRSPs on the macro and meso scale of development, while the S.L. approach focuses more on individual interventions at the micro level of projects and “participatory development.”

gender, and IDS seeks to extend these approaches and contribute insights specific to energy systems in particular.²⁴

The livelihood outcomes of men and women are the main concern in the research framework developed for addressing energy-poverty-gender linkages. The basic parameters of energy links to poverty are laid out in an annex by Andrew Barnett, and these are superimposed onto the categories used by the Sustainable Livelihoods approach (capabilities, assets, and economic activities). A number of the possible research questions proposed are intended to be disaggregated by gender, within the livelihoods strategies and other factors:

- Overall linkages between improved energy services, poverty reduction, and gender equity;
- Effects of geography, climate, and energy resources on energy access;
- Livelihood strategies of the poor, benefits from the introduction of new energy sources and how to promote positive impacts;
- Institutional factors in terms of inputs to energy decision making, use of energy services, costs, and benefits, and institutional and social arrangement to improve equitable distribution
- Income and consumption effects: Opportunities for income-generating activities due to new energy services, income generation versus consumption investments and decisions;
- Time use and time poverty: energy-related workloads, relation of time poverty to livelihood strategies, time use impacts of use of traditional fuels, how energy services can reduce these;
- Energy asset ownership and access, investment priorities;
- Human capital (health, education) and social capital benefits and access due to improved energy services e.g. communications and media;
- Empowerment and participation through community and household level decision making on energy services;
- Security, both fuel security itself and energy's role in risk reduction.

In the China case study, these questions were simplified to focus on three broad areas shown in **Box 2**: Livelihoods, Energy Services, and New Energy Services. Gender was again disaggregated as a variable for each.

²⁴ The energy critique of the Sustainable Livelihoods approach (IDS, 2003) includes:

- the lack of a specific emphasis on small and micro enterprise development (believed to be a result of S.L.'s emphasis on agriculture and natural resources);
- the lumping of energy supply and use with physical capital, which appears to gloss over distinctions between ownership and access; and
- the inability to "deal adequately with the indirect nature of the demand for energy services and the complexities introduced by the fact that some energy systems are privately and individually owned (such as the self collection of woody biomass for use in cooking) whereas others are best provided either at the level of the community (small hydro systems) or the nation (large electricity systems or the supply of paraffin and LPG)."

Box 2: Research questions on energy, poverty and gender linkages based on the sustainable livelihoods framework, as addressed in the China case study of EnPoGen

1. *Livelihoods*

- What are the principle livelihood strategies within the different study communities?
- What are the main constraints on livelihood strategies?
- How are the livelihood strategies of women distinct from those of men?
- In what ways are households poor or vulnerable?
- What are the livelihood strategies of the poor?

2. *Energy Services*

- How are energy services distributed within the study communities?
- Which energy services are most important to the poor?
- Time allocation to human energy consuming reproductive tasks.
- What are the implications of women's time poverty in terms of their livelihood strategies?
- What is the distribution of powered production equipment?
- Do poorer households benefit from gaining access to powered equipment owned by others?
- How are workloads related to ownership or access to powered equipment?
- Which households and individuals have access to communications assets (radio, television, telephone) and what human or social capital benefits flow from such access?

3. *Impacts of New Energy Services*

- Do new energy services improve access to income-earning opportunities?
- Can improved energy services reduce poverty by enabling livelihood diversification?
- What is the impact of energy services on human capital (health, education) and social capital?
- Who gains and who loses from the introduction of new energy services?
- How do women and men differ in terms of their energy service investment priorities?
- How can energy services be adapted to promote positive impacts that are relevant to the livelihoods of poor households and women?
- What aspects of the policy and institutional environment are likely to negate the beneficial effects of new energy services?
- What are the community level processes for decision-making on energy services?
- How do women participate in these processes?

Some gender-relevant findings are excerpted below from the empirical work on these questions in China (p.xiii):

- *Lack of electricity is viewed as an indicator of extreme poverty...it encourages out-migration and adversely affects the marriage eligibility of men who choose to remain in villages without access to electricity.*

Women's energy needs are different from those of men. Energy needs are clearly highly variable across the study villages but in all cases strongly influenced by different gender perspectives. This is not simply related to a traditional split between domestic and "productive" uses, a distinction that the findings suggest can be highly misleading.

- *A general view is that the major impact of electricity on livelihoods arises from its capacity to reduce general workloads and lengthen the working day, thereby increasing the possibilities for diversification of activities. Electricity is used for smaller domestic equipment and viewed mainly as a consumption item. Its importance lies in its less tangible benefits, allowing women to do tasks in the evening, allowing children to do their homework and read after dark, and providing access to television.*
- *Electricity does not seem to have made serious inroads into the time spent by women on onerous and health harming reproductive tasks. Women tend to identify the labor they have to expend on human-energy-intensive basic reproductive tasks, especially fuel gathering and water carrying, as one of the main characteristics of a life spent in poverty.*
- *There is little evidence from any of the villages that women have an effective input to decisions on equipment purchases. They report that expenditure on the purchase of items that reduced reproductive toil would always come second to productive expenditures that will generate income.*
- *The links between productive and reproductive activities are complex. For example, temporary out-migration is an important livelihood strategy that in some cases is only possible where improvements in women's access to energy services allow them to take on greater workloads, releasing their male family members to seek work outside the village.*

A relational approach to gender is suggested, as well as focusing on women as a specifically affected group. First, dis-aggregation of both direct (such as improved air quality in kitchens) and indirect (such as children's education, household health) gender benefits is recommended. Secondly, taking into account common interests and trade-offs within households is suggested: the example is given of the introduction of new technologies which enable men to gain more income but place a higher workload on women, with the overall result of reducing household poverty. "In China, for example, it

seems likely that improved energy services have released men from the heavier work and enabled them to migrate, as women can perform more tasks that were previously more labor-consuming.” (p. 34)

At the conclusion of the report, the authors evaluate the usefulness of the methodology, noting that it is difficult to integrate gender into all aspects of the framework. While the rapid-appraisal case study approach based on aspects of the SL and PRSP frameworks was considered successful in gathering in-depth information on energy and poverty, it was considered less successful in dealing with energy and gender issues, mainly because of the importance of time allocation issues to these. One key addition to the SL framework adopted for the China study is the emphasis on “time use and time poverty,” both to better address interactions between productive and reproductive work, and to focus on labour shortages as a cause of rural poverty in China. The authors point out that work is still needed to incorporate gender analysis into the SL approach, “principally because of its tendency to focus attention on productive activities and away from reproductive activities or reproduction-production linkages and thus not adequately reflect the social and gender divisions of labor in households.” (p128)

The authors do not consider their final methodology adequate for addressing the implications of energy access for time use and differential impacts on men and women, and suggest that it may be difficult (though important) to develop a non-intrusive and cost-effective methodology for this purpose.

From a gender perspective, several comments can be made about the SL/PRSP framework developed by IDS:

- The data gathering framework is based on participatory action research. A number of gender-sensitive data collection techniques are used, e.g. male and female focus groups; but it is not clear from the process documentation to what extent gender analysis methods were systematically adopted.
- The framework as applied here is supply-driven (due to the terms of reference), focusing on electricity explicitly (though not exclusively); the choice of end-uses for electricity is seen as critical to poverty impacts by gender. The clearest energy benefits for these women though are cited as cooking improvements (boiling water with solar cookers and improved stoves for smoke reduction).
- The EnPoGen project framework clearly prioritises energy and poverty. Gender is considered a sub-set of poverty: women receive attention because they constitute the majority of poor people, and because doing so is believed to contribute to poverty alleviation. Gender equity is meant primarily in terms of improving welfare not human rights. Poor women are the focus, though there is some differentiation between women in slightly better off and poorest households. The definition of “energy poverty” as used in the framework is however not gendered.

- The broadened framework calls attention to inter-actions between productive and reproductive labour and to the role of women's domestic labour in enabling income earning; income-generation is the main focus, as relevant to the financial sustainability of energy interventions.
- Intra-household dynamics receives some attention, but as with the focus on the household as a unit in S.L., the interests of men and women in the household are generally assumed to be unitary or complementary, rather than divergent.
- The energy sector itself as a source of women's employment and raising productivity is not considered, nor the potential for women's own knowledge and agency in the energy sector.
- The framework is rural-oriented; as pointed out by Wendy Annecke (CRGGE listserve, 14.03.04), gender and energy may mean different things in terms of changing gender relations in rural and urban societies.
- Comments by the external peer review group contributed considerably to strengthening the analysis of gender and energy in the report. However these comments were not able to influence the data collected in China, as fieldwork had already been completed.

2.2 The Gender-Energy-Poverty Nexus: Finding the energy to address gender concerns in development²⁵

Current thinking on the gender-energy-poverty nexus is explored under a DFID project (Clancy, Skutsch and Batchelor (2003), attempting to bring energy into poverty and sustainable livelihoods discussion based on an analysis of the literature. Contrary to the IDS report, gender is the central concern in this paper. It first shows how energy is an essential but often invisible input to sustainable livelihoods, and argues that access to clean and affordable energy should be viewed as a core dimension of poverty. The gender component of energy poverty is attributed to the fact that 70% of people living in poverty are women, and that women have specific needs and constraints that differ from men's.

Box 3: Possibilities for improving the position of women through energy

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

²⁵ J. Clancy, M. Skutsch and S. Batchelor, *The Gender-Energy-Poverty Nexus: Finding the energy to address gender concerns in development*, DFID project CNTR998521, 2003.

Four gender-related questions relevant to energy poverty are considered:

- Who makes the decisions about energy within the households, and who benefits? (men compared to women)
- What are the implications for women of biomass fuel use? (especially health)
- How do women cope with their energy problems? and
- What are the implications for women of current energy policies?

The paper then turns to the question of how to move women and their families out of energy poverty. Energy poverty in this report is defined as the “Absence of sufficient choice in accessing adequate, affordable, reliable, clean, high-quality, safe and benign energy services to support economic and human development.” (p. 4). This definition emphasizes choice, rather than purchasing power as in the definition of energy poverty in the IDS China (2003) report, discussed in the previous section. The IDS definition emphasizes the relation between reproductive labour and economic activity, which is absent in the Clancy et al report’s definition, however.

Suggestions for improving the position of women through energy from the point of view of women’s practical, productive, and strategic needs are given, by using electricity, improved biomass, or mechanical energy (**Box 4**). The paper argues, following Skutsch (1998), that it is important to see energy as not just an efficiency or welfare element in development, but also as an indirect means for enhancing gender equity.

To adequately deal with gender aspects of the energy-poverty nexus, two transformations are advocated:

- Empowerment of women to make choices about energy, as well as
- Responsiveness by the energy sector to provide affordable modern energy equipment that addresses women’s needs.

The paper next looks at opportunities and constraints in energy and sustainable livelihoods, for example the role of energy in small business sustainability. A number of examples are given of how energy in livelihood strategies can improve the position of women, either by creating opportunities or relieving the constraint of energy scarcity.

The paper concludes that “energy dimensions both of the poverty-gender nexus and the livelihoods analysis, have been poorly understood and, hence, their significance underestimated.” The authors urge:

- More involvement of women in the energy sector at different levels,
- A focus on energy services, as well as
- More micro-level research on linkages.

Questions concerning the impacts of energy and the potential/feasibility of improving the situation in terms of sustainability are identified by the authors, in **Box 4** below.

Box 4: Needed areas of attention and research on gender-energy-poverty nexus within a Sustainable livelihoods framework (Clancy, Skutsch & Batchelor, 2003)

- Comparative studies of women's strategic energy needs.
- The role of energy in women's productive needs, and the extent to which energy provision has been a stimulus to women's small-scale enterprises.
- The processes by which women are enabled to become energy entrepreneurs.
- A more holistic approach to the analysis of the impacts of biomass collection and use on women's health, including the physical effects of carrying such heavy loads.
- The effects of the privatization and commercialization of energy services on enabling people to move out of poverty.
- The processes and structures which would enable better access to energy, as well as the linkages with other factors in the production process that can lead to more gender-equitable sustainable livelihoods.
- Impact assessments of community forest management in meeting women's strategic needs and livelihoods diversification, as well as fuel provision and environmental protection.
- The impact of access to improved (in terms of quality and reliability) lighting and electricity on the livelihoods of women and men.
- New, more appropriate, analytic and data gathering tools for practical use in the field that bring out the energy dimensions of gender and poverty issues.
- Comparative studies of the urban gender-energy-poverty nexus inked to livelihood strategies.

Some comments specifically from a gender perspective can be made on this gender-energy-poverty nexus approach to energy and sustainable livelihoods:

- These arguments put gender/women in the first place in the gender-energy-poverty nexus, and focus on women in the analysis.
- Impacts on women and benefits for women are detailed. The main emphasis is on disaggregating information by gender.
- Women are treated as a largely uniform group.
- Generally in the analysis, as in the EnPoGen study, gender is treated as a subset of poverty and the justification for attention to gender is the high rate of poverty among women.
- A strong point is the attempt to identify how different energy types address practical, productive and strategic needs of women, and how energy in livelihood strategies can improve the position of women by creating opportunities or relieving energy constraints.
- A major contribution of this analysis is that it focuses attention on women's productive roles and needs, both in using energy, and in the energy sector itself.
- The authors also note that gender analytical tools and frameworks that are in standard use in the agriculture, health and water sectors (the Harvard Matrix, Gender Analysis Matrix, etc.) are hardly used in energy planning.

2.3 Generating Opportunities: Case studies on energy and women²⁶

This book of case studies was prepared as part of a UNDP project under its Initiative for Sustainable Energy, and follows on to major UNDP publications such as *Energy After Rio (1997)* and the *World Energy Assessment (2000)*. It looks at new approaches to the use of energy as a means of addressing both poverty alleviation and the advancement of women, two of UNDP's major priorities. The underlying assumption is that reduced drudgery for women and girls - through lighting, cooking and productive activities - can have dramatic effects on women's education, literacy nutrition, health, economic opportunities, and involvement in community affairs, with significant benefits for their families and communities as well. The case studies, mainly from Africa, analyse a variety of (primarily decentralized and renewable) energy projects in terms of women's participation and the projects' impacts on women, in order to extract lessons about criteria for good project design and successful implementation that can be used to inform energy policies.

Lessons learned include the importance of:

1. A favourable enabling policy environment, including gender policy, and the support and coordination of local and national government initiatives.
2. Needs assessment to address actual conditions.
3. Environmental protection in the context of overcoming poverty and meeting basic needs.
4. Ensuring income-generating effects of sustainable energy efforts targeting women.
5. Effective marketing strategies for long-term financial viability.
6. Innovative financing and credit arrangements including targeted short-term subsidies to make energy equipment affordable for women.
7. Capacity-building to strengthen involvement of women and attention to women's concerns.
8. Informed participation by women beneficiaries in all phases of the project cycle.
9. Getting women's concerns into national energy policy.

A number of pro-women energy policies are suggested:

- Electricity for illumination.
- Availability of mechanical power and electricity for energy-using productive devices.
- Availability of cleaner fuels and enhanced markets to address the thermal energy needs of women related to cooking, heating and food processing.
- Technology development and dissemination in sectors and applications where women are most active.

²⁶ UNDP, *Generating Opportunities: Case studies on energy and women*, G. Karlsson and S. Misana, eds. (UNDP, New York, 2001).

- Energy service financing and credit facilities to promote energy-using business opportunities.
- Improved information on markets and consumer demand for energy products to assist women in becoming energy entrepreneurs.
- Gender equality in all economic sectors and the participation of women and women's groups in national and local policy formation processes.
- Removal of barriers to the full participation of women in economic, social and political life.

Of particular interest here is the framework used for the case studies. A number of key factors for successful project design were identified, that case study authors were asked to consider in analyzing particular projects:

- Benefits to women (not only household energy but also income production, skills training, and capacity building, as well as enhanced opportunities for growth).
- Income generation (as a means to pay for new energy equipment) by providing energy services or using more efficient energy equipment to increase profits.
- Environmental protection that also improves livelihoods.
- Access to credit and innovative financing strategies.
- Financial and practical viability through strengthening women's entrepreneurship capabilities and through organized women's groups.
- Stakeholder participation by women in energy projects, planning and policies, to produce greater benefits.

Some comments can be made about the UNDP case studies from a specifically gender perspective:

- Success factors are primarily concerned with using women's capabilities and organizations to increase the success of decentralized energy projects and their financial viability
- There is an emphasis is on the provision of welfare benefits for women.
- The analysis or transformation of gender relations is not a strong focus, and most references are to women rather than gender.
- However, some of the case studies (notably those in Bangladesh, Mali and South Africa) do address gender and strategic issues in women's participation, and this is reflected to some extent in the policies and lessons above.

Conclusions

As the development community focuses on the Millennium Development Goals, energy, poverty and gender relationships are beginning to receive attention. This chapter has reviewed three recent research initiatives that have offered new conceptual and empirical analysis on energy, poverty and gender: The IDS China (2003) research case study under the ASTAE/World Bank EnPoGen project; a literature review on gender, energy and poverty by Clancy, Skutsch and Batchelor

(2003), aimed primarily at planners; and a UNDP (2001) series of success studies on energy as a means of addressing both poverty alleviation and women's advancement. These three research projects draw largely on a sustainable livelihoods framework.

A number of interesting insights emerge from these studies, particularly concerning interactions between productive and reproductive work that may be mediated by energy access. There are also some limitations to the sustainable livelihoods framework from a gender perspective however, and these appear to apply to its use in the energy sector as well. For this reason, it will be of interest in the following chapter to examine new thinking and new frameworks specifically on gender and poverty.

CHAPTER THREE

New directions: Gender, poverty and environment

This chapter first explores the relevance of gender and poverty thinking to gender and energy. It examines the rationale behind gender equality as a development goal, and describes gender critiques of poverty assessment approaches used in the World Bank's Poverty Reduction Strategy Papers and in the Sustainable Livelihoods approach more generally. Some specific insights from gender theory that add to understanding of gender and poverty are reviewed from an energy sector perspective: a "geography of gender", gender in a "poverty trap", and the bargaining model of the household. The state-of-the-art in gender analysis, represented by the IFAD-Asia approach, is also looked at and found to be of interest for gender and energy research.

The second part of this chapter explores the relevance of new gender and environment frameworks of analysis, for gender and energy research. Gender and environment research has embraced gender theory in a deeper fashion, but is a similar sector to energy, so may offer some insights for gender and energy research.

3.1 Gender and poverty

Gender equality is central to poverty thinking in development today, including in the Millennium Development Goals (MDGs). The MDGs include gender equality as a goal in its own right (Goal #3), and also as a route to the more effective achievement of the other MDGs, for example the reduction of child mortality and decreasing hunger. The various rationales for gender equality as a focus of poverty eradication and the MDGs are masterfully analysed and empirically supported by Kabeer in her landmark 2003 review.²⁷

First, “improving women’s access to economic opportunities, as well as returns to their efforts, will clearly be critical to the goal of halving world poverty.” (Kabeer, 2003, p.144) The importance of women’s breadwinning role in both increasing household income and reducing hunger, particularly among the poor has been ignored. Addressing constraints that undermine returns to women’s labour is hence essential, for women in low-income households to take advantage of the opportunities generated by economic growth. This means

- dismantling various forms of discrimination in the public domain, and
- greater attention to women’s workloads in the domestic domain.

Relying solely on improving the earning capacity of male breadwinners, Kabeer argues, is not sufficient, since “households are not necessarily egalitarian. Rather there is evidence of stark inequalities in the distribution of basic welfare in the household.”

The second rationale for addressing gender equality specifically in the MDGs is that human development outcomes are inter-related. Both first-order needs such as food and health, and second order needs such as access to contraception, education and economic opportunities that improve the quality of life and the capacity for agency, are synergistic: women’s education, for example, leads to lower fertility in a number of ways. The value attached to women and girls in a family and a society – both economic and social value – will determine the gender gap in these human capabilities and development outcomes. The connection between women’s productive and reproductive work is critical here:

In regions where women have been denied an economically visible and socially acknowledged role in production, and have been confined to an economically devalued and socially invisible role in the domestic area and reproductive work, they and their daughters have had shorter life expectancies, poorer health status and more circumscribed life choices than both men and boys in their own cultures and women and girls elsewhere. (p. 167)

²⁷ Kabeer, Naila, *Gender Mainstreaming in Poverty Eradication and the Millennium Development Goals: A handbook for policy makers and other stakeholders*, London: Commonwealth Secretariat/International Development Research Centre/Canadian International Development Agency, 2003.

Conflicting demands on poor women's time results in longer working hours than men in their families, greater fatigue and nutritional deprivation, and the withdrawal of children, especially daughters, from school to help with chores. Kabeer argues that building on the positive synergies between different aspects of human development includes addressing gender inequality in access to resources, including time, in the household.

Women's empowerment is the third rationale presented by Kabeer for the centrality of gender equality to poverty alleviation. Since the causes of poverty can be found in power relations that govern how resources are distributed in society, the poor by definition lack power, and empowerment of the poor in general is part of the agenda of poverty reduction. "At the same time, poor women are generally subordinate to poor men, so reduction of poverty thus has to take account of gender inequalities among the poor, including inequalities of power." (p.170) Access to education, paid employment, and political participation are the three indicators of women's empowerment used in the MDGs to measure women's agency in re-negotiating their roles in production as well as reproduction in the family and in the larger society.

How well have poverty assessments actually addressed gender equality as central to poverty alleviation? This section explores the current "state of" poverty assessment, and gender approaches and critiques within these.

Gender in poverty assessments

Most poverty assessments carried out in the past decade at least acknowledge gender as a category for analysis. But poverty assessments have been widely criticized for failing to incorporate gender adequately. Both participatory poverty assessments as done in Sustainable Livelihoods analysis, and the World Bank's Poverty Reduction Strategy Papers (PRSPs), have come under fire.

The World Bank Poverty Reduction Strategy Papers (PRSPs), have been found inadequate in gender analysis by a number of experts (Whitehead and Lockman, 1999); UNIFEM, 2001; Zuckerman 2003; Bell, 2003). Deficits identified include:

- lack of collection of appropriate sex-disaggregated and qualitative data,
- insufficient policy consultation with gender advocates and women,
- isolating comments to certain sectors, and
- emphasis on the market economy at the expense of the household economy.

The World Bank's own Gender and Development Group (GDG) took stock of a sample of PRSPs in 2001 and found that incorporation of gender into the PRSP had thus far been minimal. Kabeer (2003) summarises the problems identified:

[The GDG] found that less than half [the PRSPs] discussed gender issues in any detail in their diagnosis of poverty. Even fewer integrated gender analysis into their strategy, resource allocation and monitoring and evaluation sections. Gender issues were, predictably, better integrated into the 'health, nutrition and population' sectors (the

reproductive sector) and to some extent in education (a quasi-social sector). Elsewhere, if mentioned at all, it was “often a passing reference or a vague intention. (p. 205)

Kabeer goes on to add that, even though little attention is paid to women’s roles in the productive economy in the PRSPs, there is even less attention paid to gender inequalities in voice, power and influence, e.g., issues such as domestic violence, political education, legal literacy and promotion of women’s participation in local government to ensure its responsiveness to their needs. Both the process of preparing the PRSPs, and the national policy environment on women and gender, have also been cited as constraints (Roddenberg, 2003).

Unevenness in understanding of gender dimensions of poverty has been noted in many participatory poverty assessments as well. Gender analysis in participatory assessments is frequently called unsystematic and incidental. This has been attributed by Kabeer (2003) to two factors:

- First, bias in the process, with gender-awareness depending very much on who conducts the assessment, and what they consider relevant to ask and explore. The perspective of the research team and the analytical model can also “screen out” relevant gender information if this does not fit with preconceptions. “Researchers blinded by populist sympathy for the poor easily overlook gender relations of inequality.’ (Jackson, 1998)
- Second, “poor people’s perceptions” are given great weight in participatory assessments, but these reflect social norms and values that may not attach weight to gender inequalities. Women themselves often subscribe to these values. The ‘public’ nature of participatory assessments construct ‘local knowledge’ according to existing social relationships (Mosse, 1993 in Jackson). Jackson (1998) also cites the problematic nature of wealth ranking, which obscures the situation of women within the households ranked, and adds that group work is not necessarily equally open to all.

In the energy sector, the EnPoGen energy and poverty assessments in Indonesia, India and China (IDS, 2003; Matly, 2003; Masse, 2003; Madon, 2003) have been described in 2.1 as a useful attempt to adapt the Sustainable Livelihoods framework to include both energy and gender in this type of analysis.²⁸ Some limitations in terms of attention to gender have already been pointed out in 2.1, in particular the subsuming of gender as a subset of poverty. Indeed the authors of the China study themselves point out that more work is needed to develop a methodology for capturing the implications of energy access for time use and differential impacts on men and women.

Participatory poverty assessments such as that used in the EnPoGen case study on China have been recognized for their potential for capturing some of the gendered aspects of

²⁸ Indeed, a major reason for IDS being asked to carry out the case study was because it was viewed by many in the Bank as the pre-eminent expert on participatory methods and poverty, due to its involvement in the recent Voices of the Poor study for WDR 2000.

poverty (Kabeer, 2003). Examining these aspects mentioned by Kabeer (see box 5), some though not all of this potential does seem to have been captured in the IDS study:

Box 5: Gendered aspects of poverty potentially captured by participatory poverty assessments, as captured by IDS China study

- *Forms of disadvantage that affect poor women more* – in China, women’s greater time burden or “time poverty” is highlighted.
- *The connections between production and reproduction* are made more visible, for example the link between women’s overwork and the inability of these households to move out of poverty in the study regions.
- *Variations in household relationships* - the China study shows that men and women have different bases for their livelihood activities, and different family responsibilities, but does not investigate separation of income streams in the household.
- *The vulnerability of female-headed households* is not a major feature of the China study; indeed, vulnerability of households *without* women is shown.
- *Gender differences in priorities* do not emerge strongly from the study; rather priorities of women and men are seen as similar.
- *Policy-related inequalities and unequal treatment* – this is mentioned in the historical background, but is not related to energy in the analysis.
- *Women’s lack of access to resources* – this is mostly subsumed in the China study in the finding of a general lack of resources in these poor villages.

To what extent do the EnPoGen studies suffer from what Kabeer (op cit) calls “bias in the process, with gender-awareness depending very much on who conducts the assessment, and what they consider relevant to ask and explore,” or from the analytical model of S.L. “screening out” relevant gender information that does not fit with its preconceptions? Certainly gender analysis was present in the EnPoGen case studies, but it is difficult to evaluate the process, because at least as reported, methods often appear unsystematic. Even a careful reading of facts dispersed throughout the reports gives only some clues to what methods were used to gather gender-specific data, and these clues are not always encouraging. One wonders what other findings and understandings might have come to light had gender analysis been more of a systematic focus.

In the China study, two research teams of two men and two women conducted fieldwork in five sites using both quantitative and qualitative methods. It is not stated whether the researchers were trained in gender analysis, but methods used for data collection were state-of-the-art participatory rural appraisal methods such as mapping, seasonal calendars, focus groups, interviews with key informants, etc. It is mentioned that a representative of the women’s federation was interviewed if one existed, and that personal narratives of female and male household members who had experienced change with electrification were taken. But gender composition of groups, gender of enumerators, and sex of respondents are not identified in the main report. There is little process documentation or reflection on the adequacy of gender methods, either; for example, at one point in a village case study it is stated that 50% of respondents were

men, 30% women and 20% men and women together, but the implications of this for the data are not discussed.

In the Indonesia case study under the EnPoGen project (Madon, 2003), the qualitative study included observations and three focus group discussions with women (as well as three with men). The quantitative survey addressed heads of households, of which 11 per cent of households were found to be female headed. Information was apparently not collected though from women in male-headed households directly, rather it seems that male heads of households gave information about activities and perceptions of females in the household. In order to analyse gender differences, responses by female-headed households were compared with those of male-headed households; however there is no possibility to compare women and men within the same household.²⁹

The Sri Lanka study of EnPoGen (Masse, 2003) also included both a qualitative and quantitative phase. In the Sri Lanka study, it appears that both men and women were interviewed, but the study does not break down the numbers of women and men consulted. Findings on women, e.g. benefits, time use, appear to reflect the perceptions of the main household respondent, whether male or female. The percent of female-headed households is also not mentioned. In neither study is the sex of the enumerator indicated. In these studies, not only is key information missing, but apparently the gender aspects of the methodology were not believed to be highly significant information to include in the reporting.

Both the Sustainable Livelihoods framework and the PRSPs are still under development, and both are making improvements in their approach to gender, in response to these gender critiques. Recent gender theory has added to the understanding of gender and poverty and offers some new perspectives that may also be helpfully applied in gender and energy analysis as well:

- a “geography of gender”, rather than a generalized “feminisation of poverty”;
- gender as a category in its own right, not a subset of poverty;
- the bargaining model of the household as opposed to the unitary model; and
- systematic gender analysis as an operational tool in poverty approaches.

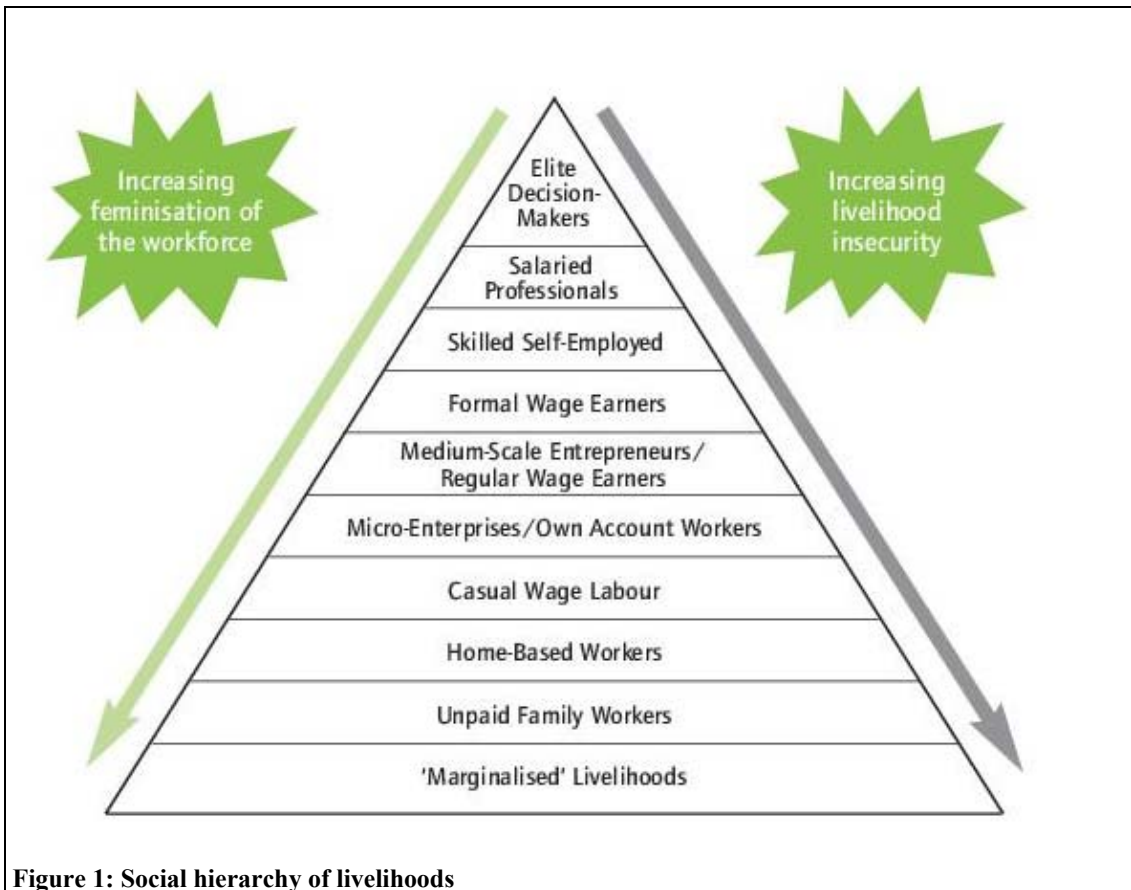
A geography of gender

Analysis of gender in energy and poverty assessment has generally been justified largely on the basis that the majority of the poor are women: the UNDP (1995) figure of women making up 70 per cent of the poor is often quoted. Cecelski (1998) first drew the attention of the energy community to this fact, as well as the prevalence of disadvantaged female-headed household in the poor, at the Village Power conference in 1998:

²⁹ The reason given by Michel Matly (personal communication, April 2004) is that focus group discussions showed no differences between responses of men and women. So it was decided to use resources for surveying larger numbers of households, rather than for interviewing of both male and female household members. This is a surprising finding however, given the differences in roles and interests between men and women documented in other studies in these societies.

The presence of a large number of female-headed households in many developing countries, as well as women’s primary responsibility for energy procurement and management, gives this energy poverty a particular gender bias.....The risk of poverty is greater for women.

While it is true that women are the largest group of poverty-stricken, gender theory offers a more nuanced view of female poverty that can be linked to more specific interventions, differentiating poverty among locations and groups of women and emphasizing that poverty is a gendered experience. Rather than an anonymous “feminisation of poverty”, Kabeer (2003) describes a “geography of gender” – regional differences in the forms and magnitude of gender inequality, formed by family and kinship ideologies and relations, state legislation, public action and macroeconomic change. A “social hierarchy of livelihoods” that influences gender inequalities is also suggested by Kabeer. This hierarchy suggests that as feminisation of the workforce increases in occupations, so does livelihood insecurity.



Even the assumption that female-headed households are poorer than male-headed households does not seem to hold in all countries, with female-headed households more over-represented among the poor in Latin America and Asia than in Africa and the

processes by which households become female-headed varying considerably (Quisimbing, 2001). The emphasis on poor female-headed households in poverty assessments is said to avoid the more important and difficult area of intra-household poverty (Jackson, 1998).

Impacts of labour-saving energy technology for example have been shown to differ by group of women within countries according to their access to economic opportunities – for example, introduction of rice husking mills in Java in the 1970s displaced landless, poor women from employment, but eased the work of women in landed families who could afford to invest in the new technology, as well as probably increasing the income of women in matriarchal societies in Western Samoa who reportedly invested cooperatively in the profitable new technology (Cain, 1985).

Gender analysis in energy has largely treated women as a homogeneous group in terms of access to assets and other resources.³⁰ There has been a particular focus on poor rural women in much energy analysis. Survey information has sometimes provided some tantalizing glimpses of differences in energy consumption patterns by women, usually in terms of income or other attributes rather than labour or social relationships. For example, Barnes and Sen (2003) found that in a large sample survey in rural India, women in electrified households read more than those in non-electrified households, regardless of level of literacy or income. Higher income women did benefit more from electricity, especially through ownership of more appliances. Also in India, illiterate women using biofuels were found by Parikh and Laxmi (2003) to have a higher rate of respiratory diseases than those with primary education. In Ethiopia, women at lower income levels were found to adopt fuel-saving practices (such as soaking legumes) that went against traditional norms, while higher-income women limited themselves to practices, such as using the fire consecutively for different practices, that were considered part of the traditional concept of the ideal woman or *bale moya* (CEPPE, 1987). Such differences in energy use have seldom been explained in the context of gender relations however.

Gender in the “poverty trap”

Secondly, gender theory has challenged the perception of gender issues in development as a variant of poverty problems, asserting rather that gender is an important crosscutting category of analysis in itself. In EnPoGen research, for example, in line with Sustainable Livelihoods and PRSP thinking, gender is incorporated within the new broader concept of poverty (empowerment, security, opportunity) that is believed to address gender bias along with poverty alleviation. But if the subordination of women is not caused by poverty, then gender analysis is needed independent of poverty assessment. Jackson (1998) argues that gender needs to escape from the “poverty trap”, and:

³⁰ Though gender and energy research in South Africa may be an exception: Wendy Annecke (CRGGE Listserve, 06.04.04) asserts that due to the liberation struggle, South Africans have always seen gender relations in terms of power and privilege and have not treated women, poor or otherwise as a homogeneous group.

*...that the concept of poverty cannot serve as a proxy for the subordination of women, that antipoverty policies cannot be expected to necessarily improve the position of women and that there is no substitute for a gender analysis, which transcends class divisions and material definitions of deprivation.*³¹ (p. 39)

The energy sector has also found it attractive to collapse gender into poverty, and many of the same reasons given by Jackson for this trend apply. As shown in the first section of this paper, early narratives on women and energy were constructed around women as victims of the energy crisis, a trend that has been largely sustained in gender critiques of mainstream energy practice. Thus it is easy to combine women with the poor as victims. Gender discourses have also had to be raised within the energy community, itself dominated by men, and where it has been easier to bring gender in under the poverty umbrella, and to argue for the feminisation of poverty, than to insist upon gender as crossing boundaries of class and ethnicity, or even directing attention to the gendered character of the energy community and institutions themselves.

A more complex inter-linkage of gender and poverty is offered by Kabeer (2003). Gender is viewed as the most pervasive type of social inequality, and pervasive across different groups in society, which “intersects with economic deprivation to produce more intensified forms of poverty for women than men.” Women’s role in the productive sphere is generally highest among poorer households, yet “there is a marked inequality in the resources that men and women are able to mobilize to carry out their responsibilities, in the value and recognition given to their contributions and in their capacity to exercise agency on their own behalf.” (p.xiv)

Kabeer critiques the Millennium Development Goals for overlooking women’s economic agency as a force for poverty reduction: gender equality appears mainly in relation to health and education, not poverty eradication, in the MDGs. Yet women’s work is an important route through which poor households escape from poverty.

The importance of productive as well as reproductive work for poverty alleviation is demonstrated in the EnPoGen China study, where the key role of women’s labour in the success of household livelihood strategies is identified in one poor household where the woman is absent: “People said that the absence of a woman to manage the household and contribute labor was the main factor in pushing the household into poverty.”

The bargaining model of the household

Thirdly, the unitary model of the household prevalent in conventional poverty models (including energy and poverty analysis) has long been disputed by gender theorists. The notion of the household as a site of conflict, negotiation and bargaining replaces the concept of the household as a place only of cooperation. Household members in this model cooperate in production and reproduction because they can achieve higher returns

³¹ Jackson also raises the highly relevant question, if gender and development activities are justified by the concentration of women among the poor, does this mean that where poverty is not feminised, there is no justification for gender and development?

jointly than through their individual efforts. Conflicts over the terms of cooperation or the distribution of gains are solved either through bargaining and cooperation, through threats (covert or overt), or through compliance because of subordination. If the system breaks down, a member may exercise the exit option and withdraw from the household entirely. Bargaining power within the household is determined by members' "fallback position", or the resources that they can command independent of their membership in the household. The fallback position is determined not only by actual resources, but by women's and men's perceptions of their worth and contribution. (Kabeer 2003; Sen 1990; Agarwal 1994)

Application of the bargaining model of the household has been most notable in gender and energy research in South Africa, as described by Annecke (2003). For example, Annecke cites James (1993) describing how decision making on choice of household fuels (wood fuel versus gas) is related to how power is held in households in the village of Mbibi. Annecke gives other examples of how commanding labour (for example, in fuel wood collection) suggests power relations within households. She points to some qualitative energy studies in South Africa, including her own, that show a more complicated picture of both intra-household decision-making about fuel use and purchase, and inter-household sharing of fuel resources.

The China study of EnPoGen is much more concerned with intra-household dynamics than most energy studies to date, but still views household interests as predominately cooperative, on the whole. Even though the Sri Lanka and Indonesia studies of EnPoGen do not even allow for intra-household differences of interest in their data collection, and follow a unitary model of household interests, their findings nonetheless make clear that negotiation about appliance purchase *is* happening within the households studied. In Sri Lanka, for example, after lighting, TV and radio were the first appliances purchased, even though women in non-electrified households made clear that their first choice of appliances would be an iron and water heater. Irons and water heaters *were* purchased later, or in higher income households, however, showing that women do have some bargaining power.

The IFAD-Asia gender analysis approach to gender and poverty³²

Analysis of gender and poverty thinking would not be complete without an examination of the relevance to gender and energy research of the classic framework for gender analysis. The Asia Division of the International Fund for Agriculture and Development (IFAD) - known for its pioneering role in rural women's advancement - has been trying to clarify the analytic basis of gender mainstreaming and has developed new methods of conceptualizing the complexities of gender relations. While these methods are ultimately aimed at operationalising the gender analysis approach in development projects in Asia, they may also be applicable to (gender and energy) research, and do represent the state-of-the-art in gender analysis aimed at poverty alleviation.

³² This discussion is based on G. Kelkar and P. Roy, "Workshop Report: Defining IFAD-Asia's Gender Analysis Approach", *Gender, Technology and Development* 4(3), 2000.

The basis of the IFAD-Asia approach is the familiar Harvard Gender Analysis Tools and Concepts, adapted and advanced by IFAD to overcome some of its original limitations. Four major questions are raised:

1. *Who does what, when, and where – in enterprises, off-farm, farm, and household maintenance?*
2. *Who has access to and control over resources for production, knowledge, technology, time, and decision-making? Having access without control may mean great constraints and less flexibility in using the resource.*
3. *Who benefits from the existing organization of productive community and household resources? This question is closely related to roles and responsibilities and control over resources. For example, technological innovations may increase women's workload without providing any direct benefit to them.*
4. *How and to what extent do cultural systems, poverty alleviation policies, development planning, and technology projects address the practical needs and strategic interests of the community in general and women in particular?*

Four major tools are used to answer these questions (for more details on these tools, see **Annex 2**):

- The Sexual/Gender Division of Labour: paid and unpaid work, and how it is organized; how a project will reinforce or challenge this.
- Access to and Control over Resources and Benefits: assessing these, and how a project will increase women's access to and control over resources and benefits.
- Practical Needs and Strategic Needs: "Practical needs are linked to women's condition, can be readily identified, and relate to unsatisfactory living conditions and lack of resources. Strategic needs are less obvious and less readily identified by women. These are closely related to women's position."³³
- Potential for Transformation in Gender Relations: Does a project contain the seeds of change?

Crucial issues are pointed out:

- Women's ownership, control, and independent access to productive assets
- Independent income for women
- Women's participation in political and community public affairs;
- Women's effective access to knowledge and technology;

³³ For a discussion of women's practical and strategic needs put in the context of the energy sector, see M. Skutsch, "The gender issue in energy project planning: Welfare, empowerment or efficiency?" *Energy Policy*, 26:12 (1998).

- Critical assessment of globalisation and its impacts in terms of constraints and opportunities.

IFAD-Asia's ideas about operationalising gender mainstreaming are also relevant to gender and energy research. Looking both at what women and men do, and what they do not do, is seen as a first step, to see where activities must expand in order to transform gender relations.³⁴ Identifying strategic interventions with the maximum "ripple effects" that will be beneficial both for women's practical needs and for their strategic needs is advocated as the second step.³⁵ Some possible strategic interventions for IFAD-Asia with high "ripple effects" were identified at a workshop in 2000, and applying these in the energy sector can easily be imagined:

- Sub-budgets of community projects earmarked for implementation by women's groups/organization to plan and implement.
- Separate women-only groups implement key (mainstream) portions of the project.
- Women's unions as non-bank financial intermediaries in providing credit.
- Women's ownership of productive assets.
- Sharing and social provision of child care/domestic work.
- Increased recruitment of women at professional levels in decision-making positions.

Some examples of such strategic interventions can be found in the energy sector. Kelkar and Roy cite the improved stove program implemented by the Midu county branch of the All-China Women's Federation (Midu, 1999). In the Energy for Sustainable Income Generation (ENSIGN) project, the Self-Employed Women's Association (SEWA) in India acted as a non-bank financial intermediary (Ramani, 2003). In Mali, providing women's groups with energy assets is central to the Multi-Purpose Platform Project (MPPP) (Burns and Coche, 2001). These were largely individual and serendipitous arrangements though. It is difficult to find examples of the application of all four gender analysis tools and a systematic gender analysis approach in the energy sector, either in operations or in research. The argument has been made that this is due to the lack of gender analysis tools specifically adapted for the energy sector (Skutsch, 1998)

³⁴ Kelkar and Roy note metaphorically that "men are more likely to agree to women wearing pants than to themselves wearing skirts." There are a number of examples in the energy sector of women taking on men's responsibilities, e.g. in the China study of EnPoGen where mechanization allowed women to take over some of men's work and men could migrate. However there are also examples of men taking over women's tasks in the energy sector, especially when these move into the public or monetised realm and involve using men's assets, such as using cars to collect fuel wood at distances in Namibia (Cecelski et al, 2002).

³⁵ Household energy programs have been suggested as potentially having such "ripple effects" (Klingshirn, 2000).

3.2 New frameworks on gender and environment

If both recent energy, poverty and gender frameworks, and gender and energy analysis, have limitations from the perspective of gender theory, where can we look for further insights about linkages between gender and development, that can be applied in the energy sector? The discussion of gender and poverty thinking in 3.1 above offers some possible directions, but these lack sectoral specificity. For this reason, the present section reviews some key themes of recent frameworks on gender and environment – a related sector that has absorbed and applied gender theory in some depth - and explores their potential application to gender and energy analysis.

Central to the new frameworks is a critique of earlier women and development frameworks, which are seen as welfare-oriented and instrumentalist and ignoring intra-household bargaining and conflicts as well as differentiation among groups of women. The new gender and environment frameworks are, for the most part, equally critical of eco-feminism, which views women's environmental role as biologically rather than socially or institutionally determined.³⁶

Questionable links: Approaches to gender in environmental research and policy³⁷

Gender, environment and development have become a major focus of research attention, but policy formulation and project design using past approaches have not been successful, and have even been counterproductive, “neither improving women's command over natural resources nor assisting project effectiveness in environmental terms.” This is the premise of a study by Green, Joeke and Leach published in 1998 as a chapter in a broader interrogation of development from the perspective of gender analysis (Jackson and Pearson, 1998). Four contrasting policy areas are examined -forestry, water resources management, urban environmental management, and cross-sectoral legal and institutional reforms – to illustrate the lack of success in treating gender issues in standard environmental policy and programme approaches. The authors attribute this failure to “flaws in the conceptualization of social relations of gender and their relation to environmental change underlying the measures used”. Earlier frameworks applied to gender and environment are critiqued: women in environment (WED), and eco-feminism, both seen as having elements in common with women in development (WID) approaches, and similar failings. A similar critique has been applied in the discussion of biomass energy in section 1.1 above.

³⁶ Interestingly, eco-feminism has had little influence on gender and energy debates, perhaps because these have generally avoided overt feminism and conflict with male-dominated power structures.

³⁷ C. Green, S. Joeke and M. Leach, “Questionable links: Approaches to gender in environmental research and policy,” in C. Jackson and R. Pearson, eds., *Feminist Visions of Development: Gender Analysis and Policy*, London: Routledge (1998).

Five key ideas are pointed out - which the authors admit are already commonplace in gender and development research more generally, though not in environment and development research:

1) Varying relationships with the environment

Women's (and men's) relationship with the environment is seen as emerging from the social context of gender relations, and thus will vary accordingly. This challenges the women-in-environment and ecofeminist assumption that women have a special relationship to the environment, and that women's and environmental interests are synonymous.

In gender and energy, women's interests have also commonly been assumed to be the same as energy interests. Indeed a good deal of the gender and energy literature has been devoted to demonstrating this to the energy community, as a justification for involving women in energy. In fact, though, it is more likely that women's interests in energy sector objectives vary according to their social situation and may frequently diverge.

2) Women are not a homogeneous group

Gender approaches emphasise the possible differences among groups of men and women – age, status, class, etc. “For example, older women may not be concerned with fuel wood supplies if they are able to devolve responsibility for collecting onto younger women...” (Jackson, 1995, cited in Green et al op cit). Rocheleau's (1987) ‘land use’ approach to gender resource mapping is cited as a possible tool: rather than gender division of labour or gender roles approach, particular resource users can be identified and their specific incentives and constraints as well as the nature of their environmental knowledge analysed, to better understand their interests and capabilities in environmental management. This could be an interesting approach to the analysis of biomass energy supplies and use.

Differences in energy use by income group have not infrequently been examined in energy surveys: some examples are given in 3.1 above. Differences in access to energy resources, such as fuel wood or animal dung, have also been noted in landholding and landless groups. This has seldom been given a gender perspective however.

3) From gender roles to relations

Rather than gender roles, gender *relations* of tenure and property, control over labour, resources, products, and decision-making is the emphasis of gender perspectives on environment. “Power relations and bargaining processes within social institutions, such as marriage, affect resource use decisions. Women's environmentally related rights and responsibilities are almost always contingent on kin and household arrangements. In consequence, women's resource position varies amongst individuals according to their social position.” Property relations are a particular focus of feminist environmentalism

and feminist political ecology, especially informal practices which underlay formal rights.

The gender division of labour has been the main focus thus far in gender and energy research, but gender relations are emerging as a concern in some studies. Social relations are also viewed as important in gender and environment research. An example of the role of gendered social relations affected by energy policy comes from an anthropological study of newly electrified urban slum areas in Durban, South Africa. It found that the sale, exchange and borrowing of kerosene for lighting was a “social lubricant” which facilitated and maintained domestic and neighborhood networks of mutual obligation for poor women in their new and insecure urban surroundings. The introduction of electric lighting did not necessitate the same levels of inter-connectivity or intensity of neighborhood sharing and exchange (Bank, et al, 1996).

4) Participation is not the same as benefits

Gender and development approaches point out that participation in a project by women does not ensure that they will necessarily benefit. “Clearly, intra-household and intra-community decision-making processes can deny women control over resources which their own labour may have produced, including in a project context.” The authors give the example of agro forestry projects where the gender division of labour required women to tend plants that men reaped the benefits from. Women were prevented from without benefiting proportionately, even if household incomes increased overall.

Intra-household distribution of income and the determination of consumption priorities has been of interest in the energy sector, as it has been realized that women may have less command over cash than men, and that men may prioritise different energy sources, appliances, or uses, than women. Participating in rural electrification connection, for example, does not guarantee that women will be able to purchase the appliances to serve their needs and benefit equally with men.

5) Attention to the macro context

Looking at the macro context makes clear that “women’s relation to the environment emerges from a livelihood context in which resource-based activities are only one element.” Similarly, energy assessments have often been frustrated by the recognition that energy is not the highest priority for women or the poor. The prospect that either sustainable energy or improving women’s lot may be best achieved through non-energy options, e.g., increasing incomes with alternative employment, has not been much integrated.

The shift from WID to GAD approaches reflects a shift from problematising women *per se*, to problematising gender relations, in which women are subordinated. Acceptance of this shift by development agencies is seen by gender theorists as the reason for the extension of analysis from issues of women’s reproductive roles (such as health, family planning, and education), through economic roles (such as employment, income

generation, and household budgeting), and finally to more general issues of macro-economic planning, structural adjustment and debt, environmental degradation and conservation and civil and political organization (Pearson and Jackson, 1998).

In the energy sector, there has been a similar gradual extension of analysis from household to economic to macro-economic issues. Initially, women came into consideration in the energy sector only in their reproductive roles as users and producers of fuel for cooking, and the effects of energy scarcity on their ability to fulfill these roles and hence on their families' and their own health and nutrition. Women's roles in improved cook stove programs and in community forestry thus received attention. More recently, the role of access to energy in women's productive roles, as an enabling factor in women's income-generation has been noted, for example in food processing. Lack of energy as a constraint to women's employment in agriculture or off-farm employment has also been analysed, in the context of human energy needed for survival tasks such as fuel collection, food preparation and water collection and transport. And gender inequities in macro-economic energy policy, planning and pricing are now beginning to be noticed.

Feminist political ecology: Global issues and local experience³⁸

Feminist political ecology brings into a single framework a feminist perspective combined with analysis of ecological, economic and political power relations. This volume represents an explicit attempt to join feminist and political ecology scholarship, based on case studies with global coverage, in a critique of sustainable development. The case studies address the intersection of gender and environment through the lens of three perspectives:

- 1: Gendered sciences of survival - applying the feminist critique of science to environmental science, and examining gendered science of survival, from local environmental knowledge to recent innovations, to research on the unknown.
- 2: Gendered environmental rights and responsibilities – gendered resource tenure (de facto versus de jure rights, ownership versus use rights, rights by use categories); gendered responsibilities (to procure inputs or products such as fuel, to manage resources such as community forests); gendered relations of power (conflict, cooperation, complementarity, coexistence); gendered control over quality of environment.
- 3: Gendered environmental politics and grassroots activism – gendered political participation in collective action for environmental change, reasons for this, forms of activism, empowerment and voice.

These three perspectives were applied in eleven case studies in both rural and urban areas of developing and industrial countries, and seven crosscutting themes in the case studies

³⁸ D. Rocheleau, B. Thomas-Slayter and E. Wangari, eds., *Feminist Political Ecology: Global issues and local experiences*. London: Routledge (1996). Unless otherwise noted, all quotations in this section are from this source.

were identified. These are explained below, together with their applicability in gender and energy analysis:

(i) Linking environment with survival as a North-South issue

Feminist political ecology challenges the distinction between “*quality of life*” as the environmental issue in industrial countries, and *survival* as the issue in developing countries. It links environment with survival in both North and South, sometimes related to livelihoods and the conditions necessary to meet basic subsistence needs, but often related to health and safety concerns, which are demonstrated as not only a luxury for the wealthy. Thomas-Slayter et.al. (1996) includes case studies not only from India, Philippines, Dominican Republic, Brazil, Zimbabwe and Kenya, but also from Austria, Poland, Spain, Oklahoma, rural Ohio, and urban New York City. Parallels are drawn between, for example, women in:

... the West Harlem Environmental Action (WHE ACT) fighting the North River Sewage Treatment Plant; a Filipina from Siquijor struggling to find romblon, a plant once widely available for weaving sleeping mats and supplementing income; a Brazilian woman rubber tapper seeking protection of extractive reserves; or a member of the Bilbao Residents’ Association fighting the toxic fumes from a abandoned mine threatening to engulf her neighborhood. (p. 289)

Gender analysis of energy also links energy with survival, with the struggle for (mainly rural) subsistence livelihoods in developing countries the main focus. Health has also become an important issue, in the form of indoor air pollution from cooking with biomass fuels, and can probably be said to be the single most important gender issue perceived by the energy sector at the moment. The main emphasis in gender and energy has been on the micro-economic household and project level in developing countries (Cecelski, 2003).

Gender analysis in energy has primarily engaged with the situation in the developing countries, not the industrial countries. Commonalities between gender and energy in North and South have recently begun to be explored, though. In the North, issues such as equal opportunity in the energy profession, decision-making in energy policy, energy and poverty, pollution and health, preferences for energy production systems, access to scientific and technological education, and the gender division of labour in the home being prominent in the discussions (Clancy and Roehr 2003; ENERGIA, 2001). There is also some indication in industrial countries that women’s research agenda may differ from men’s, by being more skewed towards renewable energy and social aspects of energy (Clancy and Roehr, op cit).

(ii) Impact of large economic and social systems on localities

Globalisation is viewed as a necessary theme for analysis in feminist political ecology, which “focuses on the ways in which site-specific ecological and livelihood systems are linked into national and global environmental, economic and political systems which

shape, enable, and limit the opportunities and constraints occurring at the local level.” The increasing need for and reliance on cash, the spread of communications and technology, and international pressures are resulting in local communities being inexorably drawn into broader ecological, political, economic and social systems. The example is given of Saklana Valley in the Himalayas, where with the growth of the market economy, men are increasingly involved in off-farm employment while women agriculturists “are left behind in a world which does not offer them the resources, information, and tools to carry out their work effectively.” (Mehta, 1998) The effects of the expanding market on men’s and women’s ability to build systems of social exchange and social capital and sustain their distinct livelihoods is the subject of another case study in the Philippines (Shields et al, 1998).

Certainly similar themes are likely to be found in the energy sector, and affect energy access and benefits. The EnPoGen case studies in Sri Lanka and Indonesia found that electrification was one of a number of forces inexorably drawing households into the monetised economy and the “consumption world”, both directly - by requiring rural dwellers to pay electric bills³⁹ and invest in electrical equipment and appliances - and indirectly, by encouraging general home improvements and changes in consumption patterns (Matly, 2003). This trend is not especially related to gender relations in the EnPoGen studies however. A similar phenomenon has been observed in Tunisia (Cecelski et al 2001): First, obtaining a grid connection requires a permanent structure and indeed extensive new construction is observed in areas scheduled for grid extension. Second, access to TV brings advertisements and urban mores into the home, with not only increased knowledge by women of their legal rights and health issues, but also women’s increased interest in obtaining cosmetics and toiletries (and the income to afford these).

Industrial nations are not exempt from the effects of globalisation, either. An energy-related example from the feminist political ecology perspective documents struggles by women in Austria’s grassroots environmental movement with the Danube Power Company. Nuclear power plants and other pollutants just outside the borders concern women, and Austria faces international pressures to lower its high ecological standards to EU minimums (Wastl-Walter, 1998).

(iii) Gender-based asymmetrical entitlements

Unequal entitlements to resources – land, education, credit, training, extension, and so on – are a well-known feature of gender analysis. In gender and energy research, credit has been particularly pointed to as a constraint for women in acquiring solar home systems and other energy technologies (Cecelski, 1998), and some solar electrification programs have addressed women’s credit needs specifically (Sengendo, 2001).

³⁹ Which, though providing more lighting at a lower price than kerosene and candles, almost always increase the total energy bill due to higher consumption. The purchase of electrical appliances adds further to energy expenditures.

Of particular interest in the energy sector may be asymmetrical entitlements to land, since land is a key asset in the production of biomass energy. Bina Agarwal (199) argues persuasively that land is a key asset for poor women, not only as a means of food production, but as leverage in obtaining credit for off-farm employment and status in the household. Hence access to land is viewed as an important gender-based factor in livelihood diversification.

Access to land by gender has been shown to be more complicated than mere ownership, comprising de facto or de jure rights, exclusive or shared rights, primary or secondary rights, ownership or use rights, each potentially with different implications. Modern land tenure and legal reforms have not always improved the situation for women. “In Kenya’s Embu and Machakos districts, for example, most women depend on the use of local land and water resources to produce food and energy and to earn income, yet women lack legal rights and control over land and their rights of use and access are insecure....[I]n the Dominican Republic, the introduction of a timber tree (*Acacia manium*) as a men’s cash crop contributes to the asymmetries in access, ownership and control over resources.”

Access to land in some form – home gardens, community forests, roadside plantings – is necessary for biomass energy production. Furthermore, recent hopes for biomass as a modern fuel for the future imply changes in land use (Trindade, 2003) that undoubtedly have gender implications – which have been explored not at all.

(iv) The value of local knowledge

The value of local knowledge is a recurring theme in the feminist literature, in particular the recognition, use, and transfer of indigenous and informal knowledge on an equal basis with formal education. Sandra Harding’s (1991) feminist critique of scientific knowledge is often cited.⁴⁰

This is a familiar theme in the traditional biomass energy sector, where women’s local knowledge is often cited, both in relation to forestry (management and harvesting of local forests, trees and plants for fuel, food, crafts, etc.) and in relation to cooking fires (selection of species, fire management techniques, fire/stove building, etc.). Women’s expertise is less often recognised in non-biomass energy interventions, though there is evidence for the importance of local knowledge in these as well (Cecelski, 2000). Generally, though, the low status accorded women’s technical knowledge and the assumption that it is inferior and non-scientific has been remarked upon in gender and energy analysis (Ibid.). The dominant energy paradigm of large-scale, capital-intensive

⁴⁰ The five classes of Harding’s critique address:

- 1 Inequity of participation and power in science-as-usual;
- 2 Abuse and misuse of science on and about women;
- 3 Assumptions of value-free objectivity and universality in science;
- 4 Use of culturally embedded, gendered metaphors in scientific explanation and interpretation; and
- 5 Development of alternative ways of knowing and ways of learning based on everyday life, women’s experience, and explicit statement of values.

technology projects run by (usually male) professional “keepers of superior knowledge” has been blamed for this (Cecelski, 1992). The high proportion of men in decision-making positions in the energy sector, as well as in energy policy research, has been noted (ENERGIA, 2000; Annecke, 2003).

Structured validation of local women’s knowledge has had limited application in the energy sector. An interesting model from feminist political ecology is Fortmann’s (1998) work, documenting an approach to generating and sharing gendered knowledge about tree tenure and tree use, and local ownership of a research project, leading to empowerment of women in two Zimbabwe villages.

(v) *Gendered space*

Gendered space refers to areas of men’s and women’s activity and agency. For example, in a Himalayan community studied by Mehta (1998), men’s spaces are expanding, both literally as they move to and from home and new markets and figuratively, in terms of the importance attached to male activities. As men become more tightly linked to the outside world, women’s relative isolation and their dependence on men’s income-generating activities increases. This affects women’s use of the environment.

In the energy sector, it is easy to identify the kitchen and home as gendered space for women. Annecke (1999) describes changing power relations revolving around her own kitchen and compares this situation with that of a poor black woman. More negatively, Hoai and Thuy (2001) describe rural kitchens in Vietnam as always dark, poorly lit, humid, mouldy, narrow and dark, hot, dirty, near the toilet, dusty, and slippery. In Vietnam, “poorly equipped kitchens stem from the thought that it is a woman’s place and since she, and the work she performs, are both of no value, the kitchen is similarly inconsequential.” The identification of cooking fires as women’s responsibility in her “space” can even have dangerous implications for women, as in their persecution as witches causing township fires in South Africa (despite evidence to the contrary) (Bank et al, 1996).

Gendered space is a relevant concept for analysis in considering new energy technologies and interventions, for example in the placement of appliances and wiring connections in electrification. Annecke (2003) cites the work of Ross (1998), who showed that:

..the dynamics around space and gender have an impact on the financial viability of the electrification programme. She constructed her argument by observing that the ready board (supplying the light and plug socket for a stove) was located in the room used for leisure and entertainment, where cooking was not an acceptable activity. Thus the woman moved her activities out of the room to the only other space available – outside, and resumed cooking on a fire. The result was that electricity was used for only lights and television. Since cooking makes the heaviest demands on electricity this reduced the consumption of the household significantly, affecting the cost-recovery of the programme, which depends on minimum levels of consumption.

Gendered resource mapping could be a useful tool, to map control, responsibility and labour in various spaces – or of various energy sources? – in considering placement and access to new energy technologies.⁴¹

The creation of legitimate public space for women is another aspect of gendered space. In Bangladesh, low income women's participation in a cooperatively owned micro-enterprise that manufactures and sells energy products such as lamps and micro-grid services, has not only brought additional income, and given women the opportunity to acquire technical and business skills; by targeting women, the energy production activity reduced their social exclusion and increased their decision-making roles in the community. It changed the community's perceptions of women's capabilities, breaking down the rigidly defined gender division of labor and expanded women's income earning potential. The high desirability and the visible community-wide impacts of the energy devices have gradually elevated women's status, earning them the respect of their communities and recognition from government as providers of energy services (Khan, 2001). While this outcome might be possible with other micro-enterprise activities, energy products are particularly associated with technological knowledge, and are a valuable commodity, and hence high status, that would not be found in e.g. handicrafts.

At the policy level, public political space has also been created for women by national women's organizations that have participated in national energy policy making as stakeholders. Examples of the All-India Women's Conference in India (Balakrishnan and Mishra, 1998), Women's Action in Development in Namibia (DeKlerk and Murithi, 2002) and the Women and Energy Group in South Africa (Annecke 2003) can be cited.

(vi) Realignment of rural-urban spaces and production systems

The interconnection of urban and rural, agrarian and industrial environmental problems affecting women and men is a recurrent theme in feminist political ecology. Extractive industries such as mining, logging, and export agriculture are seen as connections whose terms are changing with global restructuring, including the terms of "gendered social relations within and between urban and rural places." Changes in natural resource markets and national land policy, the rise of national and international environmental movements, and male migration to urban workplaces are some of the examples of external forces changing the roles of rural and urban spaces and the impact of changing production systems on local communities, affecting the gender relations of power over the environment.

This theme seems similar to theme *(ii) impact of large economic and social systems on localities*, and similar examples can be given. An example that comes immediately to mind in the energy sector is that of the connections existing between urban and rural areas in charcoal and fuel wood trade, an extractive industry. A groundbreaking Uganda study on structural adjustment impacts on energy and gender (Fuuna, 1997) describes how structural adjustment has impacted on energy supplies and gendered social relations

⁴¹ See Rocheleau, et al, 1996 for an example of a sketch map of crop and tree biodiversity in gendered domains on the farm.

in the energy trade. Most rural farm households with fragmented land holdings had difficulties ensuring energy security as kerosene prices rose and demand for wood increased with back switching, especially female-headed households who needed to not only gather wood fuel during the dry season, but also do land clearing and ploughing normally done by men. But some women with access to capital were able to profit from the energy crisis, in two ways:

- Rich rural women (themselves involved in other activities and unable to move from one location to another) employed young men who had abandoned farming, to engage in a profitable cross-border trade in basic household commodities and kerosene smuggling. “The young men are thus occupied the whole week by moving from one location to another, carrying loads of kerosene jerry-cans on their heads.” (Apparently transport of kerosene for sale makes normally gender-typed head loading acceptable.) “This demonstrates that lack of infrastructure does not stop women from benefiting from adjustment, provided they have the means to hire labour.”
- Women with relatively rich husbands became engaged in selling firewood and trading in charcoal, which was traditionally a man’s job in rural areas. Men would fell trees on public land or encroach on gazetted areas to burn charcoal. The women would purchase the charcoal from them and transport it to urban centers for sale.

In both cases, women with access to capital were able to transform gender relations in energy trade in their favour.

(vii) Women’s collective struggle

Feminist political ecology emphasizes women’s involvement in collective struggles to address environment and sustainable livelihoods problems, ranging from informal social networks for exchange of resources, to local groups, grassroots movements, and political parties. Included in case studies are women’s organizations or those dominated by women, and women sometimes jointly with men, either as equals, members of women’s groups within men’s organizations, or as informal affiliates. Examples include:

- gender-based exchange networks in the Philippines that include gift-giving of natural resource-based products, and build social capital, under pressure from the marketplace (Shields et al 1996);
- women in the rubber tappers’ movement for the establishment of extractive reserves in Brazil (Campbell 1996);
- collective efforts by Kenyan rural women in self-help groups to deal with the negative effects of environmental degradation and land registration (which only recognized male heads of household): tree planting, gathering knowledge on medicinal products in the absence of a health center, weeding parties to earn income to invest in housing and income-generating projects, official connections, etc. (Wangari et al 1996)

- women in community action groups that initiated struggles against specific environmental hazards in the US (sewage treatment facility), Spain (industrial waste disposal) and Poland (industrial pollution in food). (Miller et al 1996; Bru-Bistner 1996; Bellows 1996)

There has been some reporting on gendered resistance to the development of hydroelectric dams (Yong, 2001), but little documentation of gender-based collective struggles to protest e.g. polluting energy facilities or nuclear waste disposal. At the project level, there are a number of case studies of women's groups organizing to improve their access to energy and/or to provide energy services as entrepreneurs (UNDP, 2001; Midu, 1999; a number of case studies in ENERGIJA News 1996ff). At the national level, the efforts of the Women and Energy Group in South Africa to put gender on the national energy policy agenda are well documented (Annecke, 2003).

Conclusion

Gender equality has been accepted as a goal in itself in current development thinking, and also as central to meeting poverty alleviation targets, based on various efficiency rationales. Nonetheless, gender critiques of poverty assessment methods discover bias in the process and lack of a systematic approach. Gender comments are often isolated to the domestic economy, and appropriate gender-disaggregated data not collected. Some of the same limitations apply to recent energy, poverty and gender assessments.

New thinking on gender and poverty insists rather on: differentiation of groups of women rather than treating women as a homogeneous group; gender as an important category for analysis rather than just a variant of poverty; and the bargaining model of the household as a site of both conflict and cooperation. The IFAD-Asia gender analysis approach to gender and poverty – which emphasizes women's strategic as well as practical needs and the transformation of gender roles - is found to have relevance in the energy sector. But it is difficult to find examples of the application of all four gender analysis tools in a systematic manner in the energy sector, either in operations or in research.

New frameworks on gender and environment are found to have considerable relevance for gender and energy analysis. In the energy sector, a similar critique can be made of earlier women and development approaches as welfare-oriented and instrumentalist, though they have been valuable in raising the visibility of women. Similar to the environment sector, women have varying interests in energy sector objectives according to their social situation (rather than inevitably having complementary interests, such as fuel efficiency); not only gender roles but also gender relations are relevant to energy access; participation by women in energy projects is not the same as benefits, given intra-household and intra-community decision-making processes; and energy is only one factor in the macro context.

Feminist political ecology offers perspectives for analysis on: environment and survival as a North-South issue; the impact of large economic and social systems on localities; gender-based asymmetrical entitlements; the value of local knowledge; gendered space;

realignment of rural-urban spaces and production systems; and women's collective struggle. When applied to the energy sector, these perspectives appear to have the potential to offer valuable insights into gender, energy and poverty inter-linkages as well.

CHAPTER FOUR

Gender-energy-poverty linkages: Some themes and hypotheses for research

As the historical review of approaches to gender in biomass and labour-saving energy technology research and policy in **Chapter 1** illustrates, gender and energy analysis as well as project planning and policy have remained largely within a women and development (WID) framework: welfare-oriented and instrumentalist. In this WID framework, energy access for women is *welfare-oriented*: aimed at increasing women's (and their families') welfare, by relieving women's burdens, improving their health, and helping them to earn income. There is little emphasis on women's voice, power and influence, nor in their economic agency.

The gender and energy framework has also generally been *instrumentalist*: Women's participation in energy projects is usually an instrument for increasing the efficiency of energy use and production. From an energy sector perspective, women's participation can make energy projects more "successful", for example by enabling the wider dissemination of more stoves or solar home systems, or by ensuring their proper use and maintenance.

None of these outcomes is necessarily a bad thing,⁴² and raising the visibility of gender in the energy sector has been a worthy undertaking. Despite some mention of empowerment, however, gender and energy research and policy have seldom broached the questions of the transformation of gender relations and human rights inequalities that are at the center of recent gender approaches.

Recent energy, poverty, and gender frameworks offer some important insights for gender and energy research (**Chapter 2**), in particular insights into the linkages between the domestic economy and the market economy. At the same time, from a specifically gender perspective, they have important limitations in understanding linkages among gender, poverty and energy - limitations similar to those in the poverty assessment frameworks that they are derived from (see **3.1** above). These limitations include treating gender as a subset of poverty rather than as a separate category of analysis; dealing with women as a homogeneous group rather than differentiating women by age, status, labour relations, ethnicity and race; and paying attention to gender (including methods) incidentally rather than systematically.

Research and case studies by DFID and UNDP have highlighted the participation of women in the gender-energy-poverty nexus, and emphasized in particular the importance of productive and income-generating roles in energy for women.

⁴² Though specific instances can be shown where it has had negative outcomes.

Gender theory has been explored and applied in more depth to environmental concerns. The review of recent thinking on gender and poverty, and the exploration of new gender and environment frameworks, in **Chapter 3** provide a number of principles and themes that appear to be relevant to research on gender and energy as well.

The present **Chapter 4** first considers some possible criteria for gender-sensitive energy research. It suggests a number of themes that could provide a valuable perspective for understanding energy and poverty relationships through a gender lens.

The final section returns to the two questions raised at the outset of this paper:

- Is gender equality a key variable in the success or failure of energy interventions?
- Is access to energy a key variable in women's/gender empowerment?

These questions can be explored empirically through case studies. Here some specific hypotheses for case studies aimed at better understanding gender-energy-development relationships are suggested. These hypotheses draw on the new directions in frameworks explored above, and focus on concrete gender issues faced by the energy sector, in practice.

4.1 Criteria for gender-sensitive energy research and possible themes for research on gender and energy

The absence of an accepted framework for gender and energy research and analysis has been noted in several fora (Cecelski, 1995; Clancy, Skutsch and Batchelor, 2001; IDS, 2003). A number of criteria for gender-sensitive energy research can be proposed, based on recent gender and poverty thinking:

1. *Gender is treated as a separate category of analysis, not as a subset of poverty.* While it is true that the majority of the poor are women, gender inequalities are due to the subordination of women, not to poverty (though they may be intensified by poverty).
2. *Gender analysis methods is used systematically not incidentally.* All four gender analysis tools and a systematic gender analysis approach are evident in gender-sensitive energy research. Both participatory and quantitative methods can be useful. Researchers at all levels are capable of using and interpreting gender analysis, and basic principles of gender-sensitive research (e.g. interviewing women as well as men, use of female as well as male enumerators) are followed.⁴³
3. *Gender analysis goes beyond women's practical welfare needs and project efficiency concerns, and address women's strategic needs and the transformation of gender relations.* The gender division of labour, access to and control over resources and benefits may be the starting point for research on women's practical

⁴³ Some general guidelines on gender-sensitive research could perhaps be adapted for the energy sector.

needs. But women's strategic needs and the potential for transformation in gender relations are also addressed.

4. *Women are treated as a homogeneous category*, rather differences in age, race, ethnicity, labour command, and income are used to identify different groups that experience poverty (and wealth) differently, for policy intervention.
5. *A bargaining model of the household is assumed*, rather than a unitary model with identical interests. Both conflict and cooperation are analysed, as important forces within the household.
6. *Gender relations as well as roles are analysed*: property relations, social relations, labour relations, decision-making relations (at household, community, national levels).

With these criteria in mind, the themes identified by feminist political ecology in 3.2 above can be recalled as providing a valuable perspective for understanding gender, energy and development relationships:

- *Linking environment (energy) with survival as a North-South issue*: Livelihoods and basic subsistence needs issues as well as health and safety concerns exist in the energy sector both in North and South..
- *Impact of large economic and social systems on localities*: Globalisation and external change affect energy access and benefits in rural and urban areas.
- *Gender-based asymmetrical entitlements*: Unequal access to land, education, credit, training, extension, etc.
- *The value of local knowledge*: The complex knowledge that women and men possess about energy, as the starting point for interventions.
- *Gendered space*: Areas of men's and women's activity and agency: both domestic (e.g. the kitchen and homestead), and public commercial and political space.
- *Realignment of rural-urban spaces and production systems*: Changes in natural resource markets (such as for fuel wood, charcoal and kerosene) and male migration are examples of forces for realignment that can affect the gender relations of power over energy.
- *Women's collective struggles*: From informal social networks to local groups, grassroots movements and political parties, women address energy and sustainable livelihoods problems.

To which could be added, specifically for the energy sector:

- *The intersection of the reproductive and productive economies*: How energy is affected by, and influences, women's and men's movement between these.
- *The impacts of new energy technologies, services and policies on women and men*: Ranging from improved cook stoves to rural electrification

4.2 Some possible areas for policy research hypotheses

Hypothesis 1: Gender as a key variable in household energy and indoor air pollution interventions

An example of a likely area for hypothesis development and testing is household energy interventions. Household energy interventions are generally seen as beneficial to women in a number of intersectoral ways (Klingshirn, 2000; HEDON, 1995). Many such programmes have effectively involved women as staff and entrepreneurs as well as beneficiaries. Still, many more household energy programmes have failed than have succeeded to reduce wood fuel consumption and indoor air pollution. Some past research has identified success factors (Barnes et al 1992), but this has not considered gender as a factor. One hypothesis that could be tested is that a key variable in the success or failure of household energy interventions is gender equity; specifically, that women's status – as measured primarily by the value of women's labour – can be a predictive indicator of the type of household energy intervention that will be successful in a given area.

This hypothesis draws on discussions at the Regional Workshop on Household Energy, Indoor Air Pollution and Health in New Delhi (ESMAP, June 2002), where a testable matrix was advanced (by this author) on alternative household energy approaches linked to the status of women and the value of women's labour.

Commercialisation of Fuel	Status of Women/Value of Women's Labour	
	Low	High
Low	Integrate HHE/AIP components in sectoral programmes targeting women's development (e.g., Ethiopia - GTZ)	Provide information and technical assistance in stoves construction/kitchen design (Kenya-ITDG)
High	HHE/IAP programmes include components to improve women's status/quality of life (employment, education...e.g. Nepal REDP, Kenya-Mandaleo, Mali)	Provide access to affordable improved fuels and stoves (Thailand, China)

The table suggests, for example, that in areas where both commercialisation of fuel and women's status are high, a commercial approach to marketing improved cook stoves may be perfectly appropriate and successful, as witnessed in Thailand and China. Where

commercialisation of both fuel and women's labour is low, however, a market approach may not be effective and indeed may be catastrophic, because there will be no incentive to purchase improved stoves. Here, household energy/indoor air pollution programmes may be better integrated into inter-sectoral programmes in health, agriculture, etc., that already target women and men separately, as for example in the GTZ-HEP approach in Ethiopia. In intermediate situations, where fuel commercialisation is high but women's status and access to income is low – as for example in the Nepal REDP programme or the Mandaleo stoves programme in Kenya – separate household energy/indoor air pollution programmes may be justified, but in order to reach women effectively, might need to include components to improve women's status and quality of life, such as employment and education. Low commercialisation of fuel but high status of women (even without high access to income) may favour programmes such as the ITDG approach in a Masai area of Kenya, where providing information and technical assistance in stoves construction is sufficient for successful dissemination.

Such research could build upon an earlier comparison of the China and India experiences by Nathans and Kelkar (1997), which asserted that rural commercialisation and women's employment have been a key factor in differences in improved stove adoption in China and India.⁴⁴ Where fuel is gathered by unpaid household labour, there will only be an incentive to use improved stoves if economizing on the labour of fuel collection is attractive, that is, if alternative employment opportunities exist:

Consequently, a gender disaggregated analysis of household labour time, would lead to the conclusion that it is the availability or otherwise of women's unpaid labour time that is the crucial factor in determining the extent of wood fuel use, or the extent of economizing on wood fuel use. Further, that even if income were to increase without any reduction in the availability of women's unpaid labour, then there is not likely to be a reduction in the use of wood fuel, either through using more fuel efficient stoves or through moving onto other fuels.

The authors believe this logic would hold good even with respect to the labour of children, for example, if the education of girls is not valued, then again there would be no pressure to economise on their labour in fuel collection. If women (or girls) had a cash income earning opportunity, especially one that took them away from the homestead, then there would be pressure for the household to economise on their time, e.g. through labour-saving innovations or the transfer to tasks to other household members. Kelkar and Nathan admit, however, that the analysis would only hold for farm households that collect their own fuel, not for those who buy fuel (which indeed is the case in many rural areas today).

The authors use this analysis to explain the absence of a fuel transition and high continued rate of use of wood fuels in rural areas, across all income groups. They find that in Pakistan, for example, the availability of women's free labour, rather than income levels, is an explanatory factor for patterns of use of different fuels. Comparing

⁴⁴ Nathan, Dev and Govind Kelkar, 1997, "Wood Energy: The Role of Women's Unvalued Labour", *Gender, Technology and Development*, Vol. I No.2, Sage, India, 1997.

experience in China and India, although higher incomes in China have been credited with accounting for the difference in success rates in improved stoves, the low participation of women in farm households in cash income activities in India could be an important factor. Availability of modern fuels is not necessarily an explanation either, since even in areas with a high level of mechanization of agriculture (Punjab), labour-saving modern fuels have not always been adopted (Ibid.).

The question of returns to labour as a factor in the adoption of energy technology applies not only to improved stoves, but to other energy technologies as well. Sanogo and Skutsch (2001) make the point, for example, that calculation as regards the cost-effectiveness of improved charcoal kilns is always done on the basis of returns to capital. But their case study of two women charcoal makers in Mali shows that it is returns to *labour* that may be the basis of decision making by the charcoal makers themselves. The improved kilns require a lot more labour input, even though the output of charcoal is higher for the same amount of wood.

Parkh (CRGGE Listserve, 02.04.04) makes the point that measuring women's labour only in terms of time is incomplete and therefore incorrect to a large extent. Equating women's labour with only time may be a concept suitable for white collar jobs. But here the work involves hard physical effort and drudgery.⁴⁵ Thus, labour may need to be measured with two variables, time and effort. A two variable approach to labour changes the nature of the problem.

This comment recalls Palmer-Jones and Jackson's (1997) research on work-intensity as a neglected characteristic of labour, but a significant one in the determination of human well-being and in the intra-household distribution of welfare. They too argue for more rigorous analysis of gender divisions of labour which would include work intensity in combination with time allocation.

Hypothesis 2: Energy as a key variable in the inter-section of the productive and reproductive economy

A gender perspective means recognizing that women stand at the crossroads between production and reproduction, between economic activity and the care of human beings, and therefore between economic growth and human development....

They are workers in both spheres - those most responsible and therefore with most at stake, those who suffer most when the two spheres meet at cross-purposes, and those most sensitive to the need for better integration between the two.

Kabeer (2003) quotes Gita Sen (1999) above in defining a gender perspective exactly at this inter-section of the productive and reproductive economies. Could it be that *energy access and services are a key variable in determining women's ability to transition*

⁴⁵ "For example, rather than walking ½ hour for one trip with 20 kg wood, a woman may prefer to spend 1 hour for two trips with 10 kg wood or 4 trips requiring 2 hours with 5 kg. These choices apart, one has to minimize both time and effort."

between the two, and to negotiate and benefit from the inevitable changes affecting their status, interests, and agency in the face of structural change and monetisation of both the reproductive and productive sectors of the household economy?

The relationship between the reproductive and productive economy has been the subject of a good deal of thinking over the years. Carr and Sandhu (1987) tried to determine what women did with time saved by using labour-saving technologies, in the hope that this would show that women spent more time in agriculture or income-earning as a result. Both the Carr and Sandhu study and the more recent EnPoGen case studies (IDS 2003; Matly 2003) found women's involvement in income-earning activities following the introduction of labour-saving technology interventions to be disappointing however.⁴⁶ Other recent studies have shown that time saved by women is often initially used in leisure, building social capital, and improving housekeeping (Barnes and Sen 2002). Women's first need may be for investment in themselves and their families. Ilahi (2000) finds that the time allocation of men and women does respond to economic incentives and constraints, but that this is partly influenced by how well labour and goods markets function and by social relations.

Considerable time savings, and their use to increase agricultural production and small trade activities, *have* been demonstrated in the Mali multifunctional platform project, though, and this is one of few to have been studied in a socio-economic evaluation focused on benefits to women. Time saved in processing cereals amounted to 8 hours per woman per week, in addition to time saved in rice husking and shea nut crushing. This high amount of savings may account for the clear impacts on farm production, shea nut processing, and petty trade (UNDP, June 2001).

The bargaining model of the household may be usefully applied here too: the energy sector seems to be the scene of both much conflict and much cooperation between the sexes. In Uganda, Fuuna (1997) found that men often subsidized their wife's and female relatives' informal sector food processing activities, so as to have an alternative source of household income should male salaries or jobs be reduced during hard times. IDS (2002) found that women and men in China took advantage of labour-saving energy technologies to allow men to migrate and maximize household incomes. These examples do not necessarily represent a transformation in gender roles: while women are taking over some of men's roles in income-earning in Uganda and in pig rearing labour in China, there is little evidence of men taking over women's roles.⁴⁷

As well as complementarities, conflicts are also evident, as in the Uganda study: Fuel wood is the preferred fuel for tasty cooking, and "in any case, a woman was not ready to be beaten by a husband because she has used paraffin or electricity to cook food."

⁴⁶ This may be partly a problem of invisibility. One time allocation study from a large energy survey in India showed that 64% of rural women engage in some kind of income generating activity. Yet other measures of women's labour force participation in India (that did not study time allocation) have reflected overall low participation rates (Barnes and Sen, 2003).

⁴⁷ Or, as Kelkar and Roy (2001) say, "Men are more likely to agree to women wearing pants than to themselves wearing skirts."

Henpecked husbands are also found though, “for those who cannot afford the cost [of purchasing a tree for fuel wood], especially men who are being harassed by their wives, have to steal the trees at night or when it is raining.” (Fuuna, 1997)

Some recent time allocation studies in Africa show a relationship between time spent in water collection and time spent in fuel collection – that up to a total amount of time will be used to accomplish these two tasks - and the suggestion is made that improvement in both of these simultaneously is necessary in order to have an impact on women’s time constraint (Blackden, 2001). A similar finding of trade-offs between women’s time in cooking and in fuel collection was noted some years ago in an ILO study in rural Peru (Skar, 1984).

In the energy sector, men’s better access to capital has often been cited as a reason why they frequently take over energy activities when these move from the domestic to the monetary economy, as in fuel wood trade versus collection. Does men’s better access to capital and time always give them an advantage in commercialization/monetization? (Bryceson and McCall, 1997) Some examples in 3.2 above show that women with access to capital had no difficulty in profiting from energy trade in Uganda. So the question may be whether women have the resources to take advantage of such opportunities, or how to strengthen women’s position in order to take advantage of commercialization. In the Mali platform project, for example, women’s groups were targeted to receive energy equipment specifically because women in that country did not generally have access to ownership of such assets (Burn and Coche, 2001). In Tunisia, national policy sought to strengthen women’s legal, health and educational position, as well as providing income-generation opportunities, which enabled women to benefit from rural electrification more equally than might have been the case otherwise (Chaieb and Ounalli, 2001).

Income-generating uses of energy have become of great interest in the energy community due to the need for financial sustainability, particularly in relation to renewable energy. UNDP’s *Generating Opportunities: Case studies on energy and women* (2001) views increasing the income-generating effects of sustainable energy efforts that target women, as an important means of mobilizing support. Controlling the means of production of energy – what S. Batliwala and A. Reddy (2003) have called “women’s energy entrepreneurship” – is looked to as a promising means to provide both benefits to women and dissemination of energy technologies. Examples are given in the UNDP (2001) case study volume from Mali, where women operated diesel generators as businesses and sold energy services, and from Bangladesh, where women have earned money by manufacturing lamps. Sale of energy-related products in Kenya (improved stoves) and Malawi (biomass briquettes) was found to be an incentive for women to participate, while lack of women’s involvement in the marketing and distribution of solar systems in Uganda was believed to have been a factor in their non-participation.

Yet it is typically only the minority of women who will be involved in energy production; far more may benefit from the improved availability of energy services in their businesses and domestic as well as productive activities. Still, the advantage of ownership of energy assets should not be under-estimated.

Most renewable energy projects continue to be technology-driven - either market models that aim at high penetration and financial viability (focusing on areas of high demand with purchasing power) - or basic needs models that provide free or subsidised technologies. Productive uses are becoming higher on the agendas of many development agencies, including bilateral donors and the Global Environment Facility. With the ongoing expansion of GEF Implementing Agencies to include UNIDO, the regional development banks, and perhaps FAO, as well as UNEP, UNDP and World Bank, expanded modalities will exist for doing this as well. But GEF and some other donor programmes are still limited in their ability to respond to development sector demands, due to their required focus on renewable energies to the exclusion of other energy sources, rather than being technology-neutral (GEF-FAO, 2002).

A gender perspective is only barely emerging here and issues are being identified (Cecelski, 2002; Polestico, 2002). Some hypotheses here could concern: To what extent is a focus exclusively on renewable energy (as opposed to a broad menu of energy choices) gender-neutral or gender-biased in terms of enabling transition between reproductive and productive work? Is energy entrepreneurship a realistic avenue out of poverty for poor women as compared to poor men? Does "domestic work" make "productive work" possible, by releasing labour from the necessary drudgery of survival, and have renewable (or other) energy interventions actually produced this effect for both women and men? Kelkar and Nathan (1997) believe that the pull comes from the opposite direction, and that only way to bring about an increase in fuel efficiency or in fuel switching is to increase the possibility of women's income-earning opportunities outside the household. The IDS (2003) EnPoGen study raises the question: Is the poverty impact of an energy intervention determined by choice of energy end-use technology, and thus the extent that women as well as men benefit likely to be a function of their ability to select (and retain the benefits of) particular end uses?

Hypothesis 3: Gender as a key variable in energy institutions and policy

Past approaches to gender in energy decision-making were not reviewed in part 1 of this paper, due to lack of time. However energy policy making and planning at the community, national and even international level is a critical area where gender has only begun to receive attention. It has several aspects.

At the local level, participation of women and men in local government and local organizations has received attention in poverty analysis and from gender studies, and there has been some interest from a gender and energy perspective. A number of examples of energy projects that have tried to involve women through local organizations exist, for example the Nepal Regional Energy Development Program, but most case studies conclude that women have little voice in local decision-making about energy (Matly 2003; Mahat 2003draft). Kelkar (2001) wonders whether the inclusion of women in decision making on energy projects and in the community make a difference, for instance, in the way that matters of women's drudgery are addressed or not? And can

women's decision-making roles in energy projects implicitly or otherwise question and change the social subordination of women?

At the level of national and international energy institutions, the gender composition of staff and gender relations with energy sector institutions may be important factors in the structural exclusion of gender issues from the energy sector. In South Africa, James & Simmonds (1997, cited by Annecke, 2003) pointed out that at that time in the energy directorate, all top management and the majority of the staff were white men with scientific or technical qualifications; the low importance of social science meant that blacks and women, who were more likely to have these qualifications, were less likely to be appointed. For the same reason, investigation into differential impacts of projects on women and men was not likely. Annecke adds that the appointment of a woman energy minister may have been one of the most significant factors for gender equality in the energy sector, both due to the precedent of her sex and to her priorities. Although women employees are not necessarily gender-sensitive, it may not be a coincidence that UNDP and the World Bank have both initiated and actively supported gender and energy activities at a time when their energy programmes have been headed by women.

At the level of energy policy, both policies and budgets have received some attention in gender audits. The few instances have focused primarily on policies and spending on domestic energy, as the most evident area of benefit to women (Cecelski, et al 2002; James & Simmonds 1997 in Annecke 2003). The lack of investment in household energy is perceived by Peskin et al (1992) as partly a data problem: "Thus a misleading picture of the real economic importance of informal production as well as of the actual value of substitutes is provided by national accounts. This could induce policymakers to invest in large infrastructure projects rather than informal household production." Subsectors other than household energy have received even less attention.

A case study of the process of engendering national energy policy in South Africa illustrates many of the challenges as well as some possible approaches (Annecke, 2001). The case study documents the many impediments faced by the Women and Energy Group in getting women's energy interests on the national policy agenda, and shows how they have influenced events in a number of significant ways. Feenstra (2003) analyses the conditions existing for a gender-aware energy policy in both South Africa and Uganda in a case study, and identifies five characteristics of a gender-aware energy policy: gender mainstreaming; participation of women and men; recognition of women's role in the energy provision and use and their energy needs; an integrated energy planning approach that is demand-driven and multi-disciplinary; and gender-disaggregated data on energy use.

In Zambia, Chandi (2002) found that few women were involved in the energy sector at the policy formulation level, and that there was an attempt to incorporate gender issues in the wood fuel sub-sector, but not in other, modern energy sectors. Her review of six projects found that those that incorporated gender issues at the project design stage were more successful (with success measured by end-user acceptability, purchase of electronic

equipment, initiation of income-generating activities, and increased input and output in entrepreneurial activities).

Case studies could provide information for examination of a number of hypotheses about inter-linkages between gender and energy institutions and policy. For example, does the higher representation of women on staff, or gender training of staff, result in a different budget mix (e.g., more attention to household energy, or more equitable energy pricing) that is more favorable to gender equity or even to social equity and poverty alleviation generally?⁴⁸ Participation of gender advocates and women's groups in the national consultation process has been a measure of the gender inclusiveness of PRSPs – similarly, does more participation of women's organizations in the energy policy process produce a more equitable outcome? The experience in South Africa suggests that even significant efforts may have marginal outcomes, without other support.

The effects of different pricing policies for household fuels on women and men have also been little studied. Parikh and Laxmi's (2000) economic analysis of gender bias in petroleum product imports in India argues against the present subsidy-and-rationing system, and in favour of allowing rural households who can afford to pay, to purchase kerosene. Annecke (2003) cites a targeted intervention in South Africa and suggests that more such examples of energy policies on behalf of women would be useful: "Calls to remove Value Added Tax from paraffin in South Africa were heeded just before the municipal elections in November 2000, and may have done more to improve the lives of women than all the suggestions made (but not implemented) towards the White Paper on Energy Policy in South Africa (1998)."

Hypothesis 4: Rural electrification as a key variable in gender equality

Rural electrification's impact on gender relations and women's welfare, education and empowerment, is another relevant policy area. For example, does rural electrification play a role in women's human (social and political) rights (e.g. by making it safer for women to go out at night and attend village meetings and by increasing women's access to information from television and hence power in the household)? Does electrification strengthen women's position in the household and community, or weaken it?

Annecke (2003) quotes White (1996) in the Social Determinants project in South Africa: "As a preliminary hypothesis electricity consolidates the power of the person in the household who holds the purse strings. This is generally an adult male, and any strengthening of his already dominant role implies increasing inequities in gender relations. However, the person who is strengthened by access to electricity can also be a woman if she is the sole income earner and (perhaps) has a strong personality."

⁴⁸ Recent evidence from the US suggests that higher representation of women on staff could also have a positive effect on efficiency and profits: on average in 2002, companies with a higher percentage of women in top jobs in Fortune 500 companies posted a 35 percent higher return on equity and a 34 percent greater return to shareholders than the comparison group of Fortune 500 companies with few female executives (Coombes, 2004).

Intra-household decision making about electricity has not received much attention, but preliminary findings from one study in Tanzania (Meikle, 2003) show that most energy decisions are made by men, with men's preferences, for example for a new radio, taking precedence over women's choices, for example for a new energy saving stove. Two AFREPREN studies tried to determine whether female-headed households, where women were decision-makers, would be more likely to use electricity than male-headed households (Banda, 2002; Dithale, 2002), but due to lack of data, findings were inconclusive.

The authors of the EnPoGen studies in Sri Lanka and Indonesia (Madon, Masse, 2003) believe that electrification strengthened women's position in the household, by encouraging families to spend time together in the evening and giving women the same access to entertainment and information from TV. The studies in these countries also showed how rural electrification pulled households into the monetary economy, though, not always a positive experience for women.

The question again arises of whether women will have the resources and control to take advantage of these opportunities. The importance of a gender-sensitive rural development policy in enabling women to derive benefits from rural electrification has already been mentioned. Even in South Africa, where numerous studies of the national rural electrification program have included various gender aspects, Annecke (2003) concludes that there has been no investigation of the impact above household level, and only a limited assessment of the impact of electrification on poor women.

One of the few studies to assess gender needs explicitly in a rural electrification programme, in Bangladesh, focuses attention in the master plan on the participation of women in decision-making in local electric cooperatives and in the utility itself, as employees (ECBL/ENERGIA, 2003); whether such attention could result in higher benefits for women is an unexplored area.

Time saving due to electrification, and how that time is used, is a key issue. Meikle (2003) suggests - based on research in Arusha, Tanzania - that due to the need for cash income earning, any time saved by women and girls by using energy more efficiently is unlikely to be used on education; so Millennium Development Goals should not assume this. But quantitative survey evidence from India (Barnes and Sen, 2003) and Philippines (ESMAP, 2002) shows that women do read more (and have more leisure) in electrified households, at all income levels, hence the possibility of women investing in themselves should not be automatically excluded.

The EnPoGen studies found women's participation in income-generating activities using electricity, following electrification, disappointing (Madon, 2003; Masse, 2003; IDS, 2003). AFREPREN in its gender research proposed as a hypothesis that electricity would be more likely to be used in rural enterprises where women are key decision makers (those run by female-headed households), but this proved difficult to test because so few female-headed households used electricity in their enterprises (Banda 2002; Dithale, 2002). A number of studies have shown that women's enterprises in general tend to be

heavier in biomass-fuel use, concentrated as they often are in food and beverage processing industries (Cecelski, 1995).

As part of a major policy review of rural electrification in South Africa, Crawford-Cousins (1997) raised a research agenda of questions that are seldom asked by rural electrification projects, from the point of view of a poor woman in South Africa: Which of a poor woman's household energy needs could and should be met by electricity in order to significantly change her experience of life as "difficult"? How much should a poor woman pay for electricity? - might electrification credit or payment arrangements intensify her economic marginality? Should she have the choice to cook with electricity? Will she be able to buy appropriate, affordable, safe and efficient electric appliances? Will electrification have an effect on her physical safety, her self-esteem, or her status as a woman at household, community or national level? Will it improve her access to formal and informal education? Will it affect her and her family's mental and physical health and domestic violence? How will benefits be affected by who controls resource flows within her household? How will electrification of her house contribute to the improvement of her livelihood or her access to cash income? Will it provide opportunities for her to increase her agricultural production and market her surplus for cash? Does household electrification represent an opportunity for labour saving and overcoming time constraints due to her unpaid work? Will it make her or her family less likely to migrate? Will electrification of her home make a poor woman "more modern" or give her more hope for the future?

Other possible areas for research hypotheses

There are likely numerous other areas where testable hypotheses on linkages could be advanced, e.g., privatisation of energy services and its impacts on women versus men as consumers, workers and entrepreneurs; management of forests for sustainable fuel wood; gendered energy politics and grassroots activism; and gender as a key variable in multiple fuel use, back switching, and the fuel transition.⁴⁹

A similar analysis might be applied to global climate change. Though gender issues in energy and climate change have only begun to receive attention (ENERGIA News, March 2001), lessons from past approaches to gender in energy research and policy could surely be usefully applied here as well.

⁴⁹ For example, Annecke (1993) found that income, the presence of a man and his material contribution to the household appeared to be linked and significant factors in determining whether the woman cooked a main meal or not and how long she spent cooking.

ANNEX 1: Energy, Poverty and Gender (Enpogen) in China: Problem Statement⁵⁰

Figure 2: The vicious circle of energy poverty

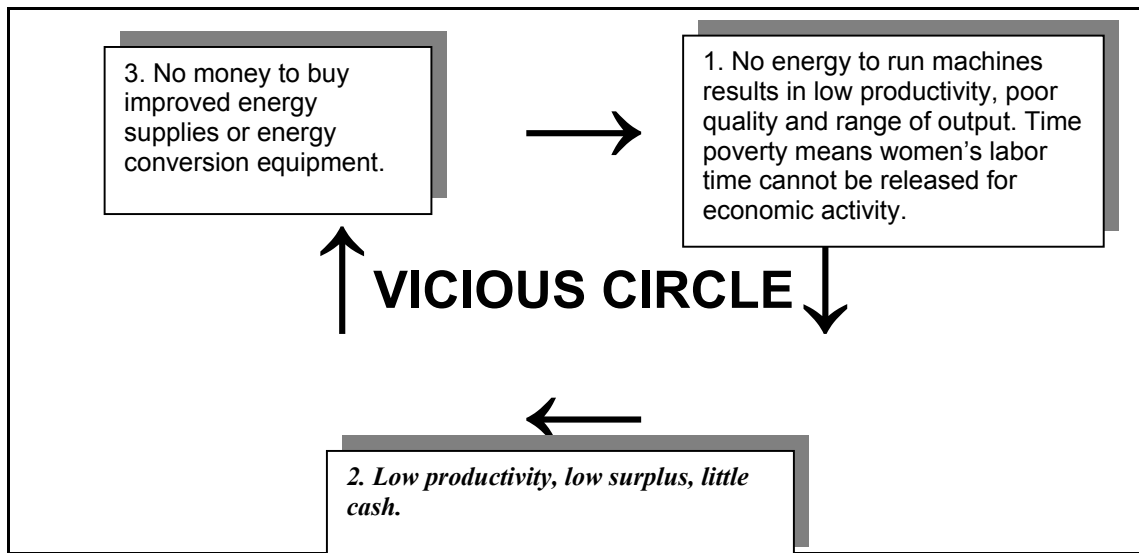
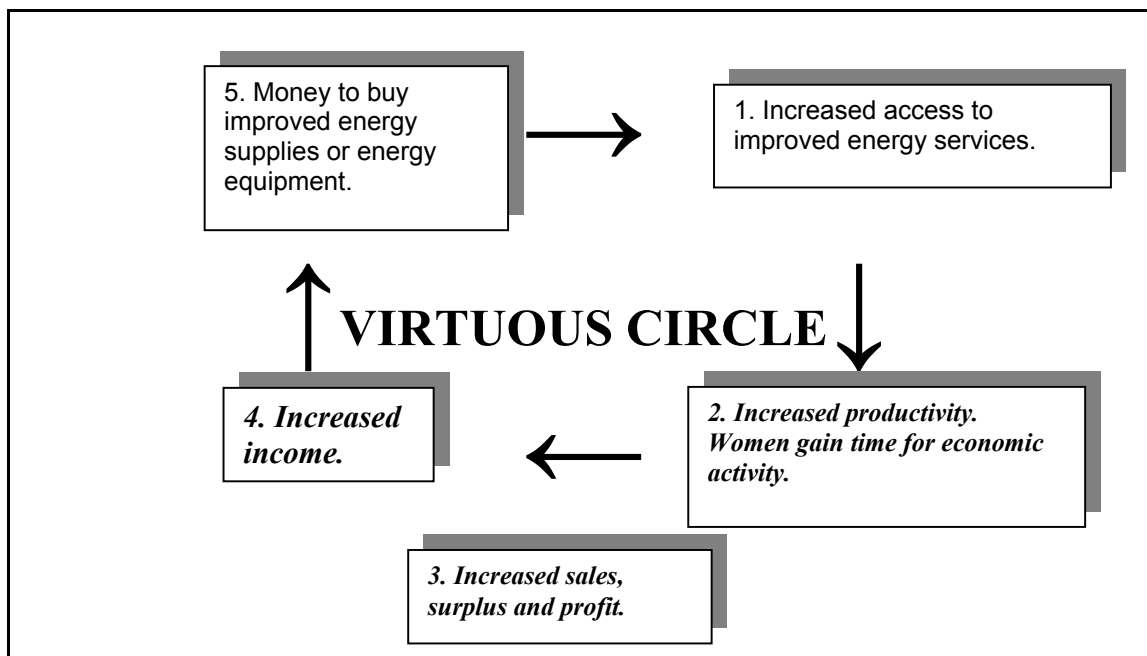
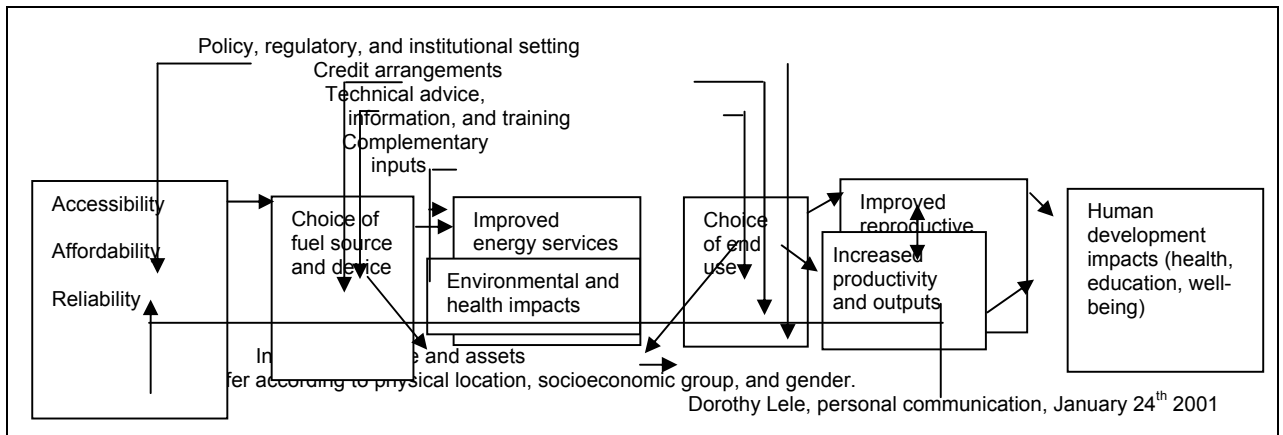


Figure 3: A virtuous circle to break out of energy poverty



⁵⁰ Institute for Development Studies (IDS), *Energy and Poverty: A Review of the Evidence and Case Studies in Rural China*, Report to the World Bank (2003). Figures based partly on Dorothy Lele, personal communication, 2001

Figure 4: Energy supply and use system



ANNEX 2: Harvard Gender Analysis Tools⁵¹

Tool #1: The Sexual/Gender Division of Labor

Society has allocated different roles, responsibilities, and activities to women and men according to what is considered appropriate. This is usually called the Sexual Division of Labor, but is more accurately the Gender Division of Labor.

This division of labor and hierarchy is not a natural order, nor is it universal in character. Its forms differ from one place to another, e.g. ploughing, basket weaving, agricultural work, construction. If it is not natural and is socially created, it can be changed.

Critical Questions:

- How is work organized in communities to be affected by the project?
- What work do men (and boys) do (paid and unpaid)?
- What are the implications of this division of labor for achieving project/program goals?
- Does the project tend to reinforce or challenge the existing division of labor?

Women are essential contributors to the social and economic well being of their families, but their work is less valued than men's. Women's work earns less prestige and remuneration and is often excluded from national economic indicators. The nature and extent of women's work can remain invisible if there is no awareness that a gender division of labor exists in the community, and inappropriate assumptions may follow about how work is organized, who does what, and how women and men will be affected by any development intervention.

Tool #2: Access to and Control over Resources and Benefits

In some cases, women may have access (the opportunity to make use of something) to resources, but no control (the ability to define its use and impose that definition on others). Resources can include:

- Economic or productive resources such as land, equipment, tools, labor, cash/credit, employable/income earning skills, employment/income earning opportunities;
- Political resources such as representative organizations, leadership, education and information, public-sphere experience, self-confidence, and credibility;
- Time, which is a particularly critical and scarce resource for women;
- Knowledge – both epistemological and technological.

Benefits can include:

⁵¹ As adapted by IFAD-Asia and presented in Kelkar and Roy, 2000.

Provision of basic needs such as food, clothing, and shelter; cash and income; asset ownership; education and training; political power, prestige, status, and opportunities to pursue new interests.

Critical questions:

- What productive resources do women and men each have access to?
- What productive resources do they each have control over?
- What implications does this pattern have for program/project activities?
- How can the project contribute to increasing women's access to and control over resources?

Benefits:

- What benefits do women and men each receive from productive, reproductive, and community work, and from the use of resources?
- What benefits do they each have control over to use as they please?
- What are the implications for program/project activities?
- How can women's access to and control over benefits be increased?

Tool #3: Practical Needs and Strategic Needs

Practical needs are linked to women's condition, can be readily identified and relate to unsatisfactory living conditions and lack of resources (food, clean water, health and education of children, increase in family income).

Strategic needs are less obvious and less readily identified by women. These are closely related to women's position (more opportunities, greater access to resources, more equal participation with men).

Critical questions:

- How and to what extent do program/project activities and organizational policies address practical needs of women and men?
- How and to what extent do program/project activities and organizational policies address strategic needs of the community in general, and of women in particular?

Tool #4: Potential for Transformation:

Critical questions:

- How does or how will the program/project contribute to the transformation of gender relations?
- How does or how will it contribute to the transformation of relations between the disadvantaged and the advantaged?

The central question is of change in gender relations. Does the project contain the seeds of change? Do participants gain confidence and skills that will assist them in other activities? Does the project support efforts to organize and to tackle related issues? Are alliances and coalitions built with other groups?

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