Round table on Gender and Electricity

New Delhi, September 26, 2014

This is a collection of notes prepared to enable an exploration into the gender perspectives in the electricity sector. We hope the notes will help initiate a dialogue on the need for a gender perspective in the electricity sector and the lessons which can be learnt from other service delivery sectors in order to determine a way forward for work in gender and electricity for policy makers, researchers and civil society.

We thank Narasimha Rao, Soma Dutta, Seema Kulkarni, Sumi Krishna, Tejal Kanitkar, Asha Achuthan and Shirish Sinha for their contributions.

Prayas,Energy Group

Notes on Gender and Electricity

Gender and Electricity – a Round table
Background note

Context

This round table is an effort to explore the relationship between electricity access and development in the Indian context through a gender lens.

There is a clear correlation between electricity access and development, though this is not a straight forward cause and effect relationship. Electricity is definitely a necessary condition for development (by meeting social and economic needs) though not the sufficient condition. Figure 1 provides a schematic representation of the potential of electricity access to promote development.

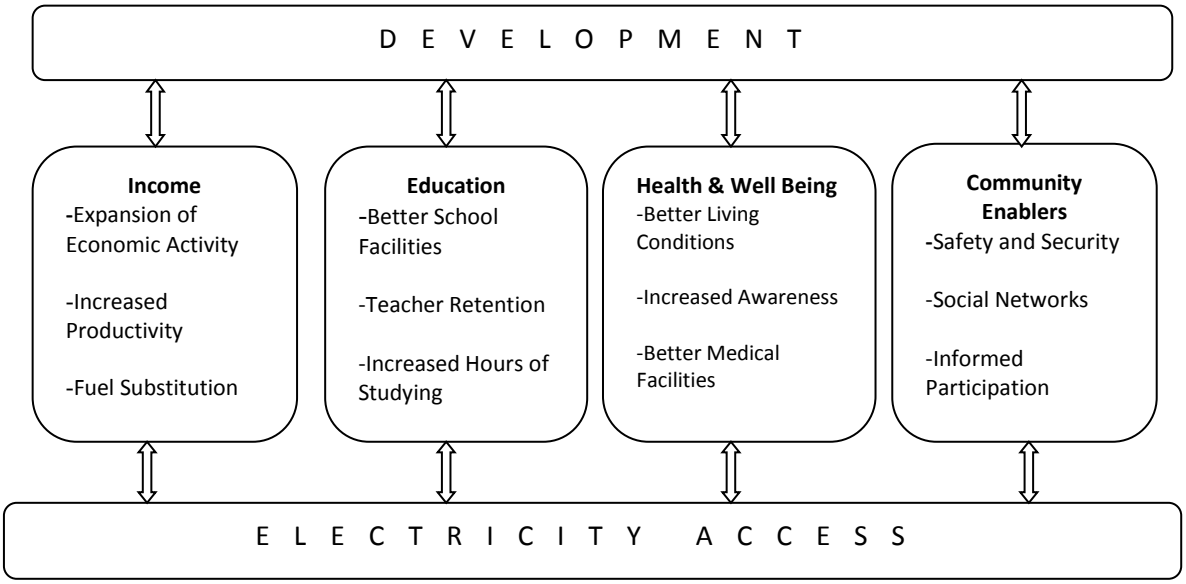

Figure 1: Potential of electricity access to promote development

Electricity access through grid based and grid interactive systems can ensure equitable, sustainable development if a balanced, participatory approach is followed in three interrelated core areas, namely policy & planning, operation and end use.

To develop such an approach, it is important to pay specific attention to the role of the marginalised (in gender, social or economic aspects) in these three areas. Informed participation by the marginalised is to be explored not just to make amends for historical injustice, but also to improve matters for all.

Electricity sector involves production, distribution, supply and end-use. Since the current focus is on last mile connectivity and end use, this round table will explore the role of gender in the three core areas from the electricity supply and end-use perspectives.

Roundtable plan

Objective & broad approach

Elaborate the gender lens and its positioning in the electricity access & development discourse in context of India. Explore how a specific focus on gender dimension in grid and grid interactive systems can improve supply and end-use.

Round table plans to meet this objective by:

- Sharing current knowledge and perspectives
- Identifying research needs
- Exploring policy & regulatory interventions
- Short listing action ideas and expected outcomes

Key questions of enquiry

To prepare for the round table and structure the event, we identify a few key questions of enquiry.

1. What is the case for a gender lens to ensure that electricity access translates to positive impacts on well-being?
2. What are the current and potential roles of women in three core areas: planning & policy, operation and end-use?
3. What if any, are the gender considerations in design, implementation and monitoring of India's recent rural electrification programs?
4. What are the major lessons from international work in this area, relevant to India?
5. What are current and future developments (technologies, policies or Institutions) in the electricity sector that can influence women's roles, rights, and opportunities?
6. What are the major lessons from gender sensitive service delivery systems in other sectors (example- water, sanitation, health, credit, cooking etc.), which could be relevant to electricity sector?

Methodology

4-5 presenters shall prepare short notes which would elaborate the key questions. These notes and important reference papers will be circulated to participants for comments one month before the event. These comments will be consolidated and if necessary, the notes revised. Based on the revised notes, short presentations will be prepared, which will be presented and discussed in the round table. A short report of the round table will be prepared, which will explain the context and elaborate some action ideas.

Participants

About 20 researchers, policy makers, civil society representatives etc., from electricity sector will be present for the discussions. A few participants will also bring in lessons from gender sensitive work in other sectors.

Developing a gender perspective in electricity access and end-use[1]

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Prepared for the round table on 'Gender and Electricity', New Delhi, September 26, 2014

This discussion note attempts to develop a gender perspective in the equity discourse on electricity access and end-use, with primary focus on grid based electricity. Before presenting the gender perspective, a brief sector overview is given, with specific attention to the institutions involved in access and end-use. The need for a gender perspective is presented in three areas, namely: policy & planning, operation & end-use and regulation. As a first step towards rooting and developing this perspective, a few action ideas are given in the last section of the note.

1. Electricity access and development

Access to reliable, affordable supply of electricity can catalyse development. This relationship is elaborated in Figure 1.

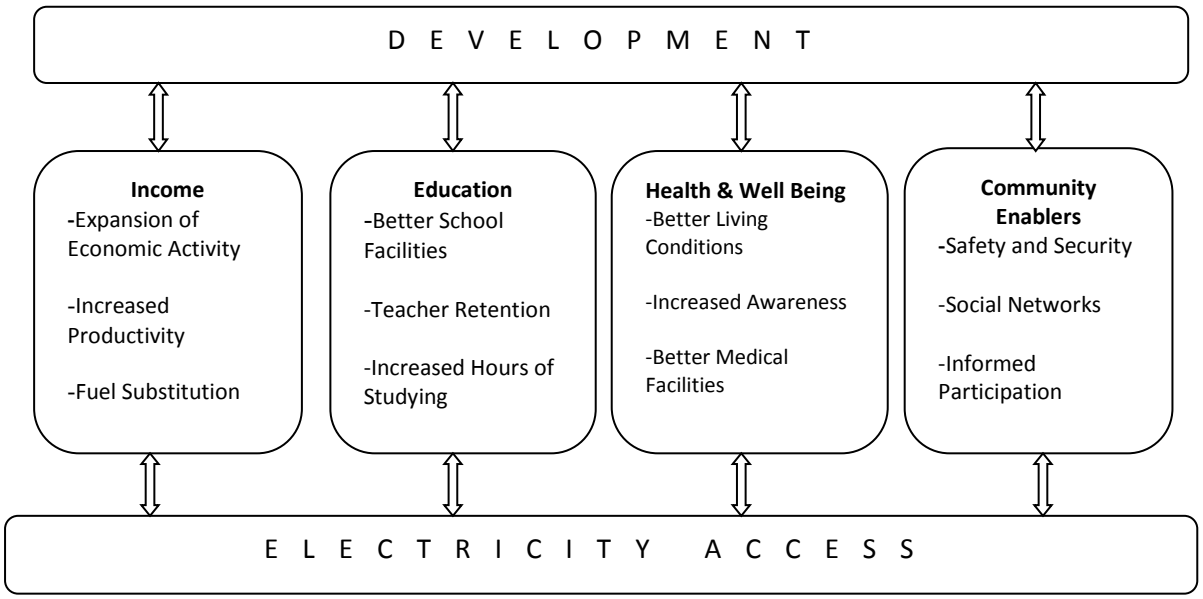

Figure 1: Relationship between electricity access and development

However, promoting equity in electricity access is essential to ensure development. Considering the existing socio-cultural and economic barriers to access any resource, electricity access programs should give specific attention to marginalised groups, even if their ultimate goal is universal access. Specific attention should include the appreciation of the negative impact of poor access, positive impact of quality power supply, causes of marginalisation and improved health of the electricity sector through informed participation by the marginalised. Marginalised groups may be identified based on caste, income, location

[1] This note has been prepared based on the lessons from our on-going work on 'electricity service and the poor', debates in Prayas Energy Group and discussions with many friends in the past few months. Our special thanks to Veena Joshi, Seema Kulkarni and Narasimha D Rao. Email for correspondence: ann@prayaspune.org

(urban, rural or remote tribal), religion or gender. These groups are not mutually exclusive or homogenous in terms of the causes, extent of marginalisation, and ways of exiting marginalised position. The discussion note elaborates the gender perspective in electricity access and end-use.

2. Locating gender in the electricity equity discourse

Socially constructed roles based on gender, caste and class not only define identities but also manifest themself at the structural level, in determining the basis for ownership of property, division of labour or the basis for social relationships. Therefore, present structures may prevent the concerns of women, especially disadvantaged women, from being voiced in the mainstream by men or women. These structures are not uniform across the country or static with time and need to be questioned.

As women do not form a homogenous group, it is important to understand the challenges in electricity access from the viewpoint of women in different situations – urban or rural, poor or rich, upper or lower caste, belonging to different religions, etc. This will help to evolve nuanced responses to address the challenges.

In the case of electricity access and end-use, households are often regarded as the beneficiaries, with the assumption that impacts within households are distributed equitably. Considering the patriarchal family and social structures, this approach disregards many challenges like prioritisation of end-use or perception and reporting of problems.

While looking at household, community or productive uses of electricity, it is no doubt important to study how quality and affordability of access impact women (like safety due to street lights or drinking water systems reducing water collection time). But this approach takes the current roles of women and men for granted. In the electricity sector, women are often perceived as passive beneficiaries of a resource provided by a sector, largely run by men. Going beyond the stereo-type roles of women and men in homes or the community, it is important to explore potential roles for women and men that would make the sector more democratic and healthy.

Another area that needs to be explored is if the electricity sector has any ‘inherent’ gender dimensions. A cursory look at the employees in the sector shows the domination of men and engineers. Is it due to certain characteristics of the sector? Do social and historical reasons have a role to play? Does male and engineer domination prevent the concerns of women being raised? Similar to many other sectors, representation of women in participatory forums (like public hearings or committees) remains low. While all these need to be studied, the fact remains that consumers are a mix of men and women, especially in the domestic sector. Hence it is important to make special efforts to bring the issues of women to the forefront. This includes addressing issues of women as passive receivers of

service, and also exploring potential roles of women as active participants to improve the sector.

3. Understanding the sector that provides access

To make the gender perspective rooted and to develop some action ideas, it is important to understand the sector. We focus on grid and grid interactive systems, because they cater to a large population (900 BU to 20 crore consumers), can support productive loads and is under-researched from a gender perspective.

Electricity sector involves four sub-sectors namely, production, distribution, supply and end-use. Production is through conventional or renewable sources with its related impacts on livelihood, local environment and climate. Distribution covers bulk transmission (tall transmission towers, big substations) and retail distribution (poles with electricity lines or underground cables, small substations, road-side distribution transformers). Both involve construction and maintenance of infrastructure.

Supply is related to last mile connectivity and services, involving connection, metering, billing, money collection and complaint handling. Supply activities also include electricity trading, which currently is limited to large consumers. End-use relates to use of electricity for energy service in homes, community (street light, water supply, health centre, Anganwadi, etc.) or productive activities (agriculture water pumping, flour mill, workshop, shops etc.). These sub-sectors are owned and operated by government or private players[2]. However, setting up the legal and policy framework as well as ensuring the regulatory oversight is the responsibility of the government. This note will focus on electricity supply and end-use sub-sectors.

Table 1 gives an outline of relevant organisations and programs in the electricity supply and end-use sub-sectors. Electricity is in the concurrent list with specified roles for Central and State Governments. The Legal and policy frameworks are formulated largely by the Central Government. This includes the Electricity Act, 2003, which provides the legal framework for the national electricity sector and national policies like Electricity Policy, 2005, Tariff Policy, 2006 and the Rural Electrification Policy, 2006. With the objective of connecting all villages to the grid and giving connections to all households, the Central Government also sponsored the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY). The State Electricity Regulatory Commissions are expected to provide regulatory oversight to all activities in the State sector.

[2] Most of the distribution and supply companies are owned by State governments. A few private companies manage distribution in Odisha and cities like New Delhi, Kolkata, Ahmedabad and Surat.

S. No	Organisation	Function	Remarks
1	Central Ministry of Power	Legal framework, policies, programs	Electricity Act, Electricity Policy, Tariff Policy, Rural Electrification Policy, RGGVY. Many of these are under revision now
2	State Ministry of Energy	Policies, budget support, state level programs	Under the central legal and policy framework
3	Distribution Companies	Distribution and Supply	State (mostly) or private owned
4	State Electricity Regulatory Commission (SERC)	Regulates all aspects in the state – tariff, investment, rules of the game	Many participatory and transparency provisions (like public hearings, advisory committee etc.) towards protecting consumer interest
5	State Electricity Consumer Grievance Forums and Electricity Ombudsman	Consumer complaint handling and redressal	Based on regulations prepared by SERC
6	State electricity inspectorate	Responsible for safety, electricity accident compensation	Functions under the State ministry of energy
7	District Committees	Convened by the Collector – monitoring of quality of supply and rural electrification	Rural electrification policy suggests representation of women
8	Village Panchayats	Has to certify village electrification, has role in monitoring quality of supply, responsible for some community use like street lighting, drinking water supply	Not playing much role now
9	Distribution franchisees	Can take up supply functions from the distribution company	Suggested in Electricity Act, but not many are operational
10	RGGVY	Central government program for grid based rural electrification	Started in 2005, continuing in 12^{th} and 13^{th} plans. New initiatives planned under 24 x 7 power supply
11	Central Ministry of New and Renewable Energy	Policy, Programs	Off grid systems, promotion of grid connected renewable
12	Distributed renewable energy service providers	Generating and supplying electricity to small communities.	Entrepreneurs, NGOs etc. Some have micro-grids connected to grid
13	Bureau of Energy Efficiency	Body under the Ministry of power, to promote appliance efficiency, energy efficient buildings etc.	National programs on standards & labelling, implements State programs through State agencies
14	Other avenues: Provisions of RTI Act, Right to Hearing Act (Rajasthan), Public Grievance Bill	These are yet to be fully explored in the electricity sector, but has lot of potential	All public authorities have to proactively disclose information, respond to RTI queries.

Table 1: Electricity access and end-use: Organisations and Programs

4. A gender perspective in electricity access and end-use

The impact of electricity service provision on the lives of women, enabling them to be better caregivers and health service providers within the household are well documented. There is reduction of drudgery and saving of time due to fuel substitution, use of electric appliances for cooking and water pumping. Installation of lights, fans can also contribute to flexibility in cooking hours and better living conditions especially for women, who spend most of their time at home. Storage of food in refrigeration reduces incidence of foodborne diseases and

expands the range of food sources available. Children who are often considered the concern and responsibility of women can study longer in the evenings. When it comes to income generation, women may not play primary role but their contribution is vital to income generating activities. Moreover, motive power can reduce load on women (e.g.-using mills for threshing and grinding of agricultural produce) and therefore, with electricity, women not only have more time but also more venues for revenue generating activities.

The impact of electrification on community institutions is disproportionately higher on women. This is clear in the case of water pumping stations, mills and other motive loads in the village. Moreover, electricity services also promote a sense of safety, especially with street lighting. Decline in crime rates thanks to electrification and evidence for reduced vulnerability of women to physical assault have been documented. Public toilets are also easier to use, especially in the night with lighting. Electrification of schools and Anganwadis will ensure there are better facilities for studying and increase staff retention which assists women in supporting their children.

Most of the current responsibilities of women are productive but are not recognised or remunerated accordingly. Therefore income generating activities by women may contribute to their voice and concerns being recognised and heard in the community. Moreover, electrification can also contribute to informed participation and positive actions by increasing awareness via television, mobile phones and community radio.

While recognizing the impacts of electrification in the existing gender roles in the Indian context, we also feel that it is important look beyond the current roles, to explore potential gender roles. It is possible that there will be changes in intra-household distribution of responsibilities which results in the sharing of work related to fuel and water collection, cooking, parenting etc. It is also possible that women will play a much larger role in the social and political activities in the community .Therefore, any efforts to assess impacts of electricity access or better service from a gender perspective must take that into account.

As can be seen from the previous section and Table 1, many actors and programs are involved in electricity access and end-use. To develop a gender perspective and possible action ideas, we examine these from three areas, namely: policy & planning, operation & end-use and regulation. This is aimed to create gender sensitive orientation in the sector and to increase informed participation of women in all the three areas.

Policy & Planning

Representation of gender concerns while formulating policies and plans would help give such issues a major thrust by determining implementation and end use practices as well as formal channels of accountability. The new government has plans to amend the decade old Electricity Act and related policies with many objectives, including the provision of 24 x7 supply to all. Development of gender indicators for electricity access could be incorporated

in the new policy framework. Similarly, programs like RGGVY could be made gender sensitive with many provisions like priority connections to woman headed households. While planning rural and urban distribution systems, there is a need to hold consultations with women organisations. Moreover, broadening the scope of district committees, Panchayats and Regulatory bodies to monitor quality of supply and provide formal feedback is also important. Since electricity access is planned to catalyse development, integrating the electrification plans with related programs like water & sanitation should be given importance.

Operations & end use

Distribution Company is the first interface in electricity access. It is necessary to make this interface more gender sensitive. This could include simpler, more accessible complaint recording and bill payment facilities or by exploring the role of community and women organisations in substation committees, franchisees and theft reduction. As far as end-use is concerned it is necessary to study the intra household dynamics in house wiring, prioritising appliance purchase (like mixies and fridges whose use has a disproportionate impact on women's lives) and usage, scope for deployment of energy efficient appliances, challenges in introduction of induction electric cook stoves etc. to remove gender biases. Participation of women while deciding community uses will also help.

Regulation

Regulatory oversight at national, State and local levels are important to make the service providers and national programs accountable towards providing affordable quality electricity supply. Bodies like State advisory committee (of the Regulatory Commission), District committee or grievance forums should have adequate number of women representing different consumer groups. In addition to the regulatory provisions in electricity, avenues like RTI should be used to improve the accountability of service providers.

5. Action ideas

Women face marginalisation due to embedded caste, class and patriarchal values in society. Understanding and challenging these values involves a broader canvas beyond electricity. Action ideas in gender and electricity should be located in that bigger effort. Some action ideas are briefly presented below for discussion and elaboration. These first steps could be in the area of service delivery and end use, as it is easy to relate to these. But in the long run, action ideas should be broadened to address the sector governance issues like demand forecast, power purchase, theft and capital investment. These are more involved but have significant impact on service delivery in the long run.

Making the policies and legal framework gender sensitive

Backed by studies and field surveys, specific suggestions could be given to the process of amending Electricity Act and national policies, as well as improving RGGVY. This could include strengthening the oversight roles of Panchayats, local bodies etc., changing the definition of village electrification to include gender indicators (like power supply during evening hours, provision of street lights, drinking water supply or electrification of Angan wadis) and including gender aspects in evaluation studies of RGGVY and the new initiatives under 24x7 power supply (field surveys to cover women, women groups etc).

Increasing representation of women

Specific suggestion could be given to increase the representation of all groups of women at all levels especially in regulatory oversight bodies. As a beginning, representation could be ensured in SERC State advisory committees, SERC consumer affairs cell, District Committees, Internal grievance forum of the distribution company, Consumer Grievance Forums etc. It could also include the appointment women's groups as consumer representatives before the State Electricity Regulatory Commissions under Section 94(3) of the Electricity Act.

Promoting informed participation of women in the sector processes

Representation is indeed a first step towards informed participation. But capacity building efforts have to be immediately taken up to ensure informed participation of women and to develop a gender sensitive perspective in all sector actors. Special efforts could be made by regulators to increase participation of community and women groups (like Self Help Groups, Water Users Associations etc.) in public hearings. Organisations working with marginalised communities should be encouraged to make special efforts to raise gender related issues in public consultation forums. There is a lot of un-tapped community potential to promote energy conservation, energy efficiency and reduce theft. Pilot projects involving urban women and rural women groups could be planned.

Addressing data and information gaps

Policy and planning processes require up-to-date and relevant data from the ground level. Today there is no gender segregated information on electricity use or impacts. It is important to commission studies and field surveys to fill these gaps. A special survey could be commissioned to gather ground data on electricity and development. Sample size could be like the NSSO, survey could focus on newly electrified States (and within the State newly electrified villages and households) even though the sample will include all types of households to capture end-use dynamics and consumption patterns. Questions could cover supply & service quality, aspirational needs for household, community and productive use etc. This could be an occasional survey.

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Research Gaps and Data Needs: Some Thoughts

This note is in support of the Roundtable on Gender and Electricity on September 26, in Pune, India. I fully support the set of questions of inquiry proffered by Prayas for this Roundtable. My objective in writing this note is to pose some (hopefully) provocative epistemological issues about the *types* of research questions being asked, the disciplines being employed, and data being collected. I suggest *some* research questions and fresh perspectives that can *complement* current research practices. These thoughts draw from a recent literature synthesis.[1]

Some Research Gaps

Intra-household power relations and the uptake of modern energy services

Most research on gender-energy access focuses on assessing the impacts of modern energy (electricity, clean cooking) on women. However, few studies analyze why and how women's status influences technology and energy service adoption. Intra-household bargaining power is a well-traversed topic in development economics and other fields, but has limited application to energy research. Further, these conditions may link to, if not drive, the benefits that modern energy may bring. Topics include women's: control over assets, resources and purchase decisions; employment and earnings; culture and social status; and direct involvement in enterprises.

Multiple dimensions of modern energy services

Research under-appreciates the multi-dimensionality of both intra-household power dynamics and the adoption of modern energy services. For example, the factors that govern modern stove *usage* more differ from those that govern stove *purchase*. Similarly, the uptake of an electricity connection may involve different factors from the purchase of electric appliances, different types of which offer different benefits for men and women. Women's own preferences and their *perception* of their own power – based on social norms, laws/rights, and other factors, also influence their bargaining power, which are not easy to measure. Finally, women's bargaining power needs to be studied not only with respect to that of spouses, but also of other household members, such as in-laws or extended family.

Rigorous, empirical impact studies of modern energy access on women/girls

The evidence on the benefits to women of modern energy is surprisingly inconclusive. That is, many studies reveal benefits, but many do not. While the *potential* benefits are not at issue, their realization is. Why? One reason is that benefits have accrued, but haven't been systematically observed or measured. Another reason is that other enabling factors – such as infrastructure and financing – may also be necessary, or perhaps more important. Yet another may be that unobserved conditions (like those mentioned above) prevent or disincentivize women from exploiting the potential benefits.

[1] Pachauri, S., & N.D. Rao (2013). "Gender impacts and determinants of energy poverty: are we asking the right questions?" *Current Opinion in Environmental Sustainability* **5(**2): 205-215.

Future studies need to systematically tease apart the influence of these different factors that affect benefit accrual in different contexts. Future work also needs to focus on understanding the causal pathways by which benefits accrue. The challenge for research design is to balance specificity, to capture context-specific drivers, with breadth, to enable some level of generalization.

The needs of women-led (energy) enterprises

Further research is needed to understand (a) the energy needs of enterprises in which women typically engage; and (b) community-based energy supply enterprises that employ or are led by women. In the former case, empirical data on energy costs, productive uses, and income effects of electricity, are lacking. In the latter, the societal and contextual factors that enable women to sustain their involvement are not well understood, among other things.

Methods

A few common threads running through past research efforts are: case studies seem to dominate research approaches; studies focus on energy conditions and women's attributes but less on the surrounding context. To isolate the effect of energy services, more quantitative studies that measure and attempt to rule out contextual factors are necessary (for e.g., can past (future) interventions be systematically evaluated (designed) using the now popular randomized controlled trials?). At the same time, several relevant societal phenomena, such as women's perception of their status and their preferences, are difficult to measure, and require ethnographic research methods, which involve spending time in the field. Both types of research are lacking,

Data

Data limitations constrain research. National sample surveys do not have the scope for capturing the nuances related to women and energy. Data collection methods, including surveys, which focus on measuring the above indicators related to women's perceptions/preferences, social norms, and enabling environments systematically across states or regions would be beneficial.

GENDER MAINSTREAMING IN RURAL ELECTRIFICATION PROGRAMMES

Provision of electricity has considerable potential to improve the lives of women as well as men. While cooking is women's major energy need, low electricity access is a limiting factor in meeting women's needs for mechanical energy for food processing and water pumping, lighting for carrying out household tasks, access to communications and information, community services such as health clinics, schools and street lighting, and in lighting and other services for small and medium-sized businesses.

Both women and men play substantial economic roles, with women bearing the brunt of domestic tasks. Women work longer hours than men and face a number of gender-based inequalities in education, employment, access to credit, land ownership, and political participation that limit their access to electricity connections and their beneits.

Many governments have adopted national gender policies and mechanisms as well as international commitments, to promote the elimination of gender inequality. Rural electriication policies often call for equitable connections and universal access. These policies provide a framework for gender mainstreaming in the electricity sector.

Gender mainstreaming in rural electriication projects can identify practical activities that can be undertaken as part of the construction phase or during operations. This technical brief provides guidance on possible gender issues and entry points in rural electriication projects as well as actions that can help ensure equitable access to the beneits of rural electriication for women and men. It is based on ENERGIA's experiences with assisting rural electriication agencies in Botswana, Senegal, Kenya and Uganda.

This technical brief was jointly produced by ENERGIA and Practical Action Sri Lanka, with inancial support from Sida.

Why mainstream gender in rural electrification projects?

- To increase positive impacts on women
- To maximise the overall impacts of a rural electriication programme
- To contribute to improving women's and men's livelihood opportunities and empowering women
- Most importantly, to ensure that women and men beneit equally from rural electriication

How can the provision of electricity change women's lives?

Documented impacts of rural electriication on women include:

- Women in electriied households read more (India)
- Savings of 1-2 hours per day due to avoided journeys for battery charging and kerosene purchases, and less time spent on household activities such as grain grinding (Sri Lanka)
- Improved homework and school performance, avoidance of eye problems, and increased enrolment of girls in schools (Tunisia)
- Increased opportunities for employment of women in electriied households and greater income (Bangladesh)
- Maternal health beneits from clinics with improved facilities from electriication (Philippines)
- Improved security provided by lighting paths and areas around houses to protect against potential attacks from people and wild animals, including snakes (Sri Lanka, Uganda)
- Improved health and safety as the need to use lammable fuels such as kerosene is reduced (Uganda, Sri Lanka)
- Household budget savings in switching from kerosene for lighting (many countries)

GENDER ENTRY POINTS IN RURAL ELECTRIFICATION PROJECTS

Planning, monitoring and evaluation

- **Feasibility and baseline studies** that assess the needs of all users, including both women and men, are essential to design a rural electriication system that serves all people equitably. Public consultation builds public support for rural electriication initiatives. Separate consultations with women and men often result in practical considerations that would be overlooked without women's input.
- **Environmental Impact Assessments (EIA)** that include gender issues can ensure that mitigation plans avoid negative impacts on women as well as men. Using gender-focussed approaches in stakeholder engagement, identifying and including speciic gender-targeted activities in mitigation planning, and adding gender indicators to the monitoring plan for EIAs can provide positive beneits as well as mitigation.
- **Monitoring and evaluation** by sex and other relevant gender indicators will enable assessment of progress toward greater gender equality and documentation of the actual impacts of electriication on women and men.

Construction

- **Way leaves compensation** paid to property owners by electricity companies for right of way using land to erect electricity posts and towers goes mainly to men, as it is mainly men who own land. Women mostly produce crops as tenants or users of male-owned land. Rural electriication construction can affect women's food production and access to land. Female spouses without land rights may not even be aware of that compensation payments were made, and the payments may be used by the male recipients for personal purposes without their wives' knowledge.
- **Local employment in rural electriication** work mostly involves men, but has the potential to offer needed off-farm employment to women. Physical and cultural obstacles to women's employment in rural electriication work do exist, but these often vary by region, and in some areas women already participate in heavy load carrying and digging. Local assessment of the current situation, and of barriers and opportunities for women, in consultation with local contractors can identify potential jobs in construction, procurement, supervision, and support. Using bid contract clauses with targets or incentives is one means of encouraging local employment of both women and men in rural electriication work.
- **HIV/AIDS prevention** is widely recognised as necessary where construction crews are active, and many electriication agencies already incorporate an HIV/AIDS prevention component in their construction projects. However often these only address workers and not community women and men, and do not consider the gendered nature of HIV/AIDS, power relations, and gender-based violence.

Operations

- **Promotion** of rural electriication can ensure that women and men, and female-headed as well as male-headed households, have equal access to electricity connections and lighting points. Women and men have different energy needs and roles in the household and are likely to want different areas of the house wired (e.g. women tend to want lights in kitchens and toilets). Men and women also respond to different promotional messages. Women may use different communication channels than men, as they have lower literacy rates, less access to TVs and radios, and less time to attend public meetings. They may also be reluctant to speak up at meetings. Women need skills training in safety and maintenance, as well as technology and payment choices that meet their speciic needs and priorities (e.g. inexpensive ready to use house wiring boxes, or pre-payment meters).
- **Access to and affordability** of electricity connections and house wiring affect all consumers. Women in rural areas may face particular obstacles due to their relatively high poverty levels, lower access to credit (compounded by low access to land as collateral), lower literacy rates, and less access to information. Earmarking subsidies for single-parent households and social infrastructure can help women in particular connect with the beneits of electricity.
- **Community, labour-saving and health beneits** can be addressed through the electrical connections for social infrastructure, such as health clinics, grain mills, water pumping, and schools. Street lighting is a valuable service to improve women's security. Linking with ministries and local government responsible for these services can assure their ongoing functioning. Utilities in Botswana and South Africa have addressed cooking needs by including modern fuels and fuel eficienct stoves as part of rural electriication promotion.
- **Productive uses of electricity such as milling, welding,** carpentry, food processing, phone charging, and tailoring in rural areas save costs in time and transport for consumers, as well as provide business opportunities for

women and men. Small retail businesses are often women-owned and beneit from nighttime operation. Phone charging is also a popular business for women. However women-owned businesses have less access to property and land for economic activities, and less access to credit needed for business investment, including electricity connection. A World Bank study in some African countries found that more women-owned irms than male-owned irms are expected to give bribes to obtain an electrical connection. Women-owned irms also wait much longer for their electrical connections than do men-owned irms.

Source: Based on ETC/ENERGIA with Nord/Sør-konsulentene, 2011. 'Gender Mainstreaming in Rural Electriication Projects in Uganda: Initial Scoping Mission Final Report to the Rural Electriication Agency (REA), Ministry of Energy & Mineral Development, Government of Uganda and The Norwegian Embassy, Kampala, September 2011'. Available at: www.norad.no/en/thematic-areas/energy/gender-in-energy

Increasing connection rates: The Ready-Box A case from Botswana

In Botswana, the Botswana Power Corporation (BPC), a parastatal utility formed in 1970, is responsible for the generation, transmission and distribution of electricity. Connection rates to the grid in the rural areas still remain low (approximately 50% in 2009). BPC has been challenged in reaching the targeted connection rates. BPC, with the support of ENERGIA, therefore embarked on a gender mainstreaming project with the overall goal of ensuring that the energy needs of both women and men are included in the planning and implementation of the rural electriication programme.

After a careful analysis of the country's context, institutional arrangements and capacities, and the realities on the ground, a Gender Action Plan (GAP) was developed together with BPC staff. The GAP was endorsed by management and is currently under implementation. Through mainstreaming gender into its grid and off-grid operations, BPC sought to develop a strategy to design and market electriication services and products to men and women to enable BPC to increase connection rates.

One of products that BPC promotes is the Ready-Box, a ready to use house wiring box, which reduces the cost of wiring a house, and ultimately the initial cost of connection. The Ready-Box is the cheapest option for wiring a house before connecting electricity and therefore has the potential to increase connection rates for poor households, but the marketing and promotion of the Ready-Box was not targeted at rural households with low incomes.

Botswana has one of the highest percentages of female-headed households worldwide. Over 45% of the households are female-headed according to the Central Statistics Ofice. Gender analysis of available literature showed that female-headed households are generally poorer, while an Energy Department survey showed that female-headed households were connected to the grid at only half the rate of male-headed households. Here was a large missed market that could be exploited to increase connections and load - a major government objective in the electricity sector.

Targeted marketing of the Ready-Box to women may well increase the connection rates of female-headed households, as has been recognised by BPC in its Gender Action Plan. To be able to reach these female-headed households, BPC is engendering its planning by including gender-disaggregated information on connection rates and on the obstacles to getting connected. In addition, the promotional material is now reviewed and made gender-sensitive. BPC is thus taking measures to achieve equitable access to electricity in Botswana, which contributes to the eficiency of its rural electriication programme.

Source: Omari, K. 2011, Gender Mainstreaming in the Botswana Power Corporation

Electrification through a Gender Lens: Power to the Poor in Lao PDR

In Lao PDR, the Rural Electriication Program managed to increase electricity access across the country from 16% to 71% between 1995 and 2010. The programme was facing an uneven distribution of growth, however, with large urban-rural disparities, as well as gender disparities. The key issue, as was shown by a 2004 social impact survey, was that in electriied villages 20-40% of the households would not connect to the grid because they could not afford the connection charges of USD 80-100. These included primarily those living below the poverty line and female-headed households.

The Power to the Poor (P2P) scheme was launched in 2008 to target the 20-40% households not connected to the grid in electriied villages. The scheme was supported by the World Bank and piloted in the southern provinces of Lao PDR. The state-owned Electricité du Laos was responsible for implementing the scheme.

In targeting the poor, P2P set up an interest-free credit mechanism, and recognised that the core issue was to keep household budgets neutral. The payments that households used to make for using car batteries or kerosene for lighting are now spent on grid electricity and repaying the interest-free loan.

P2P is using a gender-sensitive approach. This is because the majority of female-headed households belong to the poorest in the village and therefore have few – if any – available resources to pay the connection fee. Two gender-sensitive measures were taken up by the programme:

1. Gender-sensitive eligibility criteria: among non-electriied households, all female-headed and single parent households will be automatically eligible for support, as long as the house is safe to electrify.
2. Gender-sensitive outreach materials: the materials highlight the beneits of electricity for women, while consultative processes have been made gender-inclusive, for example by scheduling meetings at times when women are also available.

This approach has resulted in an overall increase in the connection rate from 78% to 95% and from 63% to 90% for female-headed households.

Source: Carlsson Rex, H. and Jie Tang, Shining a Light on Women: Results from the Power to the Poor Rural Electriication Pilot in Lao PDR, World Bank. Available at: http://www.esmap.org/esmap/node/565

GENDER AND SUSTAINABLE ENERGY

ENERGIA, the International Network on Gender and Sustainable Energy

PRACTICAL ACTION
Technology challenging poverty

Practical Action (Sri Lanka, India, Pakistan Programme)

KEY ISSUES IN GENDER AND WATER

Seema Kulkarni
Senior Fellow, SOPPECOM

Women and water: A special relationship!

Much has been written about women's special relationship with water. Images of women head loading water and walking miles on end are well etched into our minds. In urban slums women are seen queuing up before the public stand-posts or tankers and have little or no access to sanitation facilities. The nexus between lack of civic amenities such as water and sanitation and violence against women is evident in both the rural and the urban slum context. All of the hard work that women do around water gets categorized as care or nurture realizing little its significant contribution to production. None of this work thus translates into any significant gains for women in terms of either access to the resource or to the decision making process around it.

The question before us is how one turns the tables in favour of women and the broader question of gender inequities. Would entitlements and quotas change the situation? Or do we need to look at deeper issues before we hurry to seek solutions. This brief article appeals to those in the water sector to understand gender issues in its varied dimensions before setting out on policy prescriptions.

Factors that determine women's access to water

Intersection of caste and class with gender

Often the term access is used in the context of a concrete resource like land, water, credit etc. Access thus gets defined within the realm of the material without recognizing its association with other social, cultural dimensions. Access to water is mediated by a range of social, technical and production relations. Social stratification that exists across caste, class, gender and ethnic groups or other minorities manifests in every aspect of social life and water is not an exception. Ownership of property and technology, access to knowledge and information and access to decision making processes are all mediated by the different levels of stratification that we see in society.

In the Indian context caste is a pernicious system where the means of knowledge production and resources are controlled by the upper castes. The perpetuation of this system continues with the use of this symbolic hegemony (Chakravarti 2006). The perpetuation of this system has been possible through a systematic reorganizing of both the production system as well as the reproductive system which controls female sexuality. Thus we see how caste intersects with both class and gender and creates an exploitative form of exclusion. Water as a material

resource is no exception to the interplay of caste with class and gender. Rules of purity and pollution still dominate practice in India. For example, during the 1980s drought in Maharashtra, Rao (1996) cites instances of rich, upper caste farmers reclaiming wells being used by *dalits* by ritually 'purifying' them, thus compelling *dalit* women to walk farther in search of potable water. In another instance in Maharashtra violence against dalit women was reported in the severe drought that hit the entire state in 2002. The intersection between gender, caste and class in determining women's access to water is more acute during periods of drought when poor women not only experience vulnerability *as a class* (largely as the result of male out-migration), but already vulnerable women, such as *dalits*, *adivasis* single women or the elderly face even greater exploitation.

Ownership of land and associated technology, access to commons

Access to water for production is mediated through ownership to land or the technology to pump water. In rural India, land ownership largely rests with men, so access to water for women is mediated through men. Landless do not have access to water for their means of livelihood. Here we see how social relations determined by class, caste and gender intersect to mediate access to both land and water. The state on its part has not regulated this private property regime thereby perpetuating inequities across class, caste, gender and other social groups.

Often it is assumed that common property is public property, with equal access to all communities. However social discrimination often does not allow easy access to the poor and dalits and women from both these groups are affected even more.

Use of the resource

Distribution of the resource, its linkage with social discrimination is also closely intertwined with the ideology around resource use. Water understood as a commodity and an economic good has a lot of ramifications in terms of its use and the purpose for which it is used. The ideology of 'crop per drop' or 'profit per drop' or 'not a drop of water should be allowed to drain into the sea' commodifies the resource and marginalizes the people who depend on it for their survival. Unsustainable use and its concentration in the hands of few dispossesses people who depend on the resource and more so women who are most affected by such a paradigm of development.

The above discussion tells us that access is determined by the social and economic group that you may belong to. Within these women are the most marginalised as they are exploited through the systems of caste, class and patriarchy. Closely connected to the question of access is the unsustainable use of nature in this case water. Thus any solution to improving women's access and addressing gender and social justice issues in the water sector need to be grounded in this understanding of discrimination, distribution and unsustainable use.

Before we move onto what can be a possible way forward let us see how these inequities manifest in the water sector.

Manifestations of gender inequities in water sector

Manifestations of these inequities can be seen in different ways and for the purposes of our discussion here let us look at the work women do around water, the access or control they have over the resource and the decision making and knowledge production processes that they participate in

Activities

In the domestic water sphere it is the women who spend a large amount of their time on collection and utilisation of water. Many a time little girls have had to quit school to collect water and assist their mothers in these household tasks that require a lot of time.

As far as productive water is concerned, we see women extensively involved in irrigated agriculture. More than 55% women in India are involved in agricultural activities as labourers. Women are also involved in other livelihood activities concerned with fisheries or small scale cottage industries.

The other important area that women are increasingly getting into the forefront is the arena of struggles against water privatization and its misuse. Be they struggles against dams and displacement, polluting water sources, privatizing rivers, bringing in hydel power projects etc women are at the forefront. In a sense they are taking the onus of saving the water sources and securing their own livelihoods and futures of humankind.

Access or control over water

We have seen in the earlier section how women's access to water is mediated by their caste, class, household, their husbands and other men in the household. Few studies have been done to understand women's independent access to water resources. Drinking water and other domestic water is considered as a welfare arena hence it is assumed that within a household, women have equal access to domestic water. So the question of access and control remains limited to class and caste differences. However within the various classes and castes too we see discrimination amongst women in use of water.

Water for production is directly linked to ownership of land. Women's ownership to land is very limited and data in Maharashtra for a few districts shows that it is not beyond 11%. Productive water then remains in the domain of men of certain castes and classes.

Decision making

Decision making in the water sector is determined again by which social group you belong to and whether you own resources. Legitimacy and respect to participate in decision making comes from these different locations of people. Most of the water committees are therefore dominated by certain groups of men. A recent study done in Maharashtra showed that only 11% women were members of the Water Users associations for irrigation and only 3 women could be selected to be on the decision making bodies for WUAs. In the domestic water sector the representation for women on village water and sanitation committees is 33% and

in Maharashtra this is 50%. But a recent study conducted by SOPPECOM shows that although women are represented on the committee, often they are not taken very seriously when it comes to making crucial decisions around finances, water allocation etc (Kulkarni et al 2008).

Knowledge

Like access to water is mediated through your class, caste and gender location, so is access to knowledge and participation in knowledge making processes. In the water sector which is still so dominated by technology and now institutional management, knowledge of the poor and the users of water is often not considered as important. For example women's knowledge regarding the different sources fit for drinking water is often not valued in the planning process. We have several examples where the mainstream drinking water scheme caters to domestic uses other than drinking water. So women continue using the same old sources which probably are at a distance and therefore do not contribute to their drudgery reduction.

If we were to chart a graph along these four axes what we will see is that those who spend a lot of time on activities around water, for example like walking long distances for water, collecting it, utilising it for domestic purposes or for productive purposes, in fact are not getting commensurate benefits in terms of access or control over either the resource or decision making around the resource.

A gender analysis of the water sector would help practioners and students to understand this better.

Why gender becomes important in the water context

We have already looked at how the water sector is gendered. It is these very reasons that compel us to look at the different social groups and ensure their participation in the water sector.

Women spend considerable amount of time in work and activities around water both in domestic and productive spheres; women's access or control over water resources is very limited despite the amount of work they do around water; women's participation in decision making too is limited as they are not members of the key decision making and planning processes from the micro to the macro level; women's knowledge and experiences are rarely valued in the current paradigm of water resource planning and management.

All of these reasons combine to make water a women's issue. But most importantly water is a women's issue just like it is anybody else's. As equal citizens in society they need to be part of the planning processes and also accrue benefits of that planning.

Will simple solutions work then?

Issues of gender inequities in water are complex and the solutions too have to respond to this complexity. Often policy prescriptions have come in the form of including women in water institutions or at best allocating water to women as entitlements in irrigation. While these are welcome and necessary steps, they are not sufficient to address gender inequities in the water sector. Many examples would show us that quotas in water institutions do not necessarily help women in overcoming their caste, class and patriarchal barriers to participate effectively. The same barriers also do not allow them to use their entitlements productively. Thus quotas and entitlements also need to be followed with conscious efforts at the policy and practice level to engage with the complexity of the gender issues.

Experiences of bringing in representation

Over the last few decades water has been at the heart of several environmental and political debates thereby forcing technocrats and policy makers to accommodate eco and people centric views. Significant contributions from diverse fields such geography, feminism, political ecology etc. have brought about several changes in the ways of thinking and planning in the water sector. From the point of view of social equity and more specifically gender that concerns us here we see that representation of women on water related committees has been one of the major policy and programmatic measures. Reform process in the water sector has focused on institutional and economic reform from the macro to the micro levels. One of the manifestations of this has been brining in women on water and sanitation committees and irrigation committees or the water users associations. While most gender water advocates see this as a welcome beginning there is also a great deal of skepticism with regards to both its implementation and its limited framework. Narrated below are a few experiences from the micro level.

In the domestic water sector, Village water and sanitation committees (VWSC) have 50% women on them. In Irrigation i.e the Water Users Associations (WUAs) it is roughly about 33%. The first advantage of bringing women on to committees is that they are able to enter the public space which is otherwise a male domain. This has been amply evidenced in the case of domestic water. A study done in 2006-2009 by SOPPECOM and Utthan in Gujarat and Maharashtra showed that women did gain from presence in the public sphere in terms of the respect earned in the community, handling accounts, participating in meetings etc. While this was not seen universally, it galvanized a number of women and some of them used this space to also enter into the political sphere.

In Irrigation the picture is somewhat different as Irrigation is seen as a productive activity and a space to be occupied by advantaged caste and class men. 33% here did not make as significant a difference as it made in Domestic water. Unlike in the domestic water sector, the government too on its part made no concerted effort to mobilize women to participate.

Using the space, SOPPECOM made a concerted effort in one major Irrigation project in Maharashtra towards capacity building of women in irrigation management and governance. Although the 50 odd women that we trained intensively over a period of two years did not get the opportunity to participate meaningfully due to the non functional WUAs themselves, we realized that women across diverse groups had a wealth of knowledge around cropping and irrigation schedules and management practices. However the current framework of irrigation systems, water delivery and rotation schedule provided little space to accommodate those views. For example for women and also for other subsistence male farmers short duration crops, vegetables would be preferred crops, but the current surface irrigation systems are not able to cater to the frequent watering required for short duration crops/vegetables. Usually rotations would occur after a gap of about a month thereby compelling them to go in for long duration crops such as sugarcane in this area for example. The question relates not only to technical aspects of irrigation system designs but also a larger political economy question of which crops are grown and for whom. In this case clearly the answer is for the sugar co-operatives owned by the political class in Maharashtra.

The irrigation example thus points to the fact that unless the current thinking in irrigation changes, whereby women and other marginalised voices will find the space to state their views there is little that representation can achieve by itself. It also points to the fact that even for representation to work, some concerted effort and campaign is necessary on the part of the State which will ensure that women are at least present for committee meetings like they were for VWSCs.

What then should be the pathway for change

Firstly this calls for challenging our belief systems and imagery around women. We need to see their work as beyond care and nurture and as contributing significantly to production. We need to **see women's roles as dynamic and not static** so they may be collecting water and using it for domestic purposes in the current context, but policy plans need to imagine a new world for them which goes beyond collection of water and its utlisation for domestic uses. For this understanding their worldviews is thus an important reason for their participation.

We also need to challenge our notions of **women as a homogenous category** and who are often ready to ally for a common cause. Feminist studies, black feminism, dalit studies have all pointed out the need to understand the gender question with all its diversity. Similarly it is also assumed that the household is a site of co-operation and thus a homogenous unit with common concerns and common joys. Again feminist studies has shown that a **household is both a site of conflict and co-operation** and intra household differences that discriminate against younger women and children are known.

Secondly we need to **rethink how the goals of the water sector** are defined. Are they geared towards social justice and sustainable use is a question we must not forget to ask. Both

sustainable water use from the point of view of the environment and social justice needs to be brought to the centre stage. Minimum assurance of water for meeting livelihood requirements of all therefore becomes the central programme in livelihood security. It goes without saying that for every human being life becomes more meaningful if he/she has access to assets and skills to engage meaningfully in certain activities to fulfill livelihood needs.

The main argument of this paper is that while access and entitlements to both the resource and the decision making structures are an important step in furthering gender concerns in water, they are not sufficient by themselves as access is also determined by the social and production relations which can change in a re-imagined development paradigm.

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KEY ISSUES IN GENDER AND WATER

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Much has been written about women's special relationship with water. Images of women head loading water and walking miles on end are well etched into our minds. In urban slums women are seen queuing up before the public stand-posts or tankers and have little or no access to sanitation facilities. The nexus between lack of civic amenities such as water and sanitation and violence against women is evident in both the rural and the urban slum context. All of the hard work that women do around water gets categorized as care or nurture realizing little its significant contribution to production. None of this work thus translates into any significant gains for women in terms of either access to the resource or to the decision making process around it.

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Use of the resource

Distribution of the resource, its linkage with social discrimination is also closely intertwined with the ideology around resource use. Water understood as a commodity and an economic good has a lot of ramifications in terms of its use and the purpose for which it is used. The ideology of 'crop per drop' or 'profit per drop' or 'not a drop of water should be allowed to drain into the sea' commodifies the resource and marginalizes the people who depend on it for their survival. Unsustainable use and its concentration in the hands of few dispossesses people who depend on the resource and more so women who are most affected by such a paradigm of development.

The above discussion tells us that access is determined by the social and economic group that you may belong to. Within these women are the most marginalised as they are exploited through the systems of caste, class and patriarchy. Closely connected to the question of access is the unsustainable use of nature in this case water. Thus any solution to improving women's access and addressing gender and social justice issues in the water sector need to be grounded in this understanding of discrimination, distribution and unsustainable use.

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We also need to challenge our notions of **women as a homogenous category** and who are often ready to ally for a common cause. Feminist studies, black feminism, dalit studies have all pointed out the need to understand the gender question with all its diversity. Similarly it is also assumed that the household is a site of co-operation and thus a homogenous unit with common concerns and common joys. Again feminist studies has shown that a **household is both a site of conflict and co-operation** and intra household differences that discriminate against younger women and children are known.

Secondly we need to **rethink how the goals of the water sector** are defined. Are they geared towards social justice and sustainable use is a question we must not forget to ask. Both

sustainable water use from the point of view of the environment and social justice needs to be brought to the centre stage. Minimum assurance of water for meeting livelihood requirements of all therefore becomes the central programme in livelihood security. It goes without saying that for every human being life becomes more meaningful if he/she has access to assets and skills to engage meaningfully in certain activities to fulfill livelihood needs.

The main argument of this paper is that while access and entitlements to both the resource and the decision making structures are an important step in furthering gender concerns in water, they are not sufficient by themselves as access is also determined by the social and production relations which can change in a re-imagined development paradigm.

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TOWARDS UNDERSTANDING THE GENDER ASPECTS OF GRID-ELECTRICITY: A Note for Discussion

Sumi Krishna

Since the 1970s, policy and action-research specifically related to women/ gender and development has focused on the domestic rather than the productive sphere. Women, stereotyped as nurturers and carers, are recognised for their domestic roles and responsibility but not for their equally significant roles in agriculture and other productive activities. Despite more progressive terms of discourse, women's participation and opinions continue to be sought in circumscribed areas, which are seen as being in their domain. So, while gender aspects of local renewable energy may be addressed, the supply and end use of grid-electricity from a distant source is viewed as a technical male domain in which women have little say. Such a dichotomy of sub-sectors of a field like energy or water is typical of the patriarchal framing of knowledge that shapes development policy, practice and research.

Most of the electricity supplied through the all-India power grid is generated at sources distant from where it is used. The large-scale generation of hydro, thermal and nuclear electricity has been contentious; women have been in the forefront of movements against some projects and there is a fairly vast literature on the gendered aspects of such electricity production. (Reviewing the environmental impact assessment of a hydroelectric dam that would submerge women's shifting cultivation fields in eastern Arunachal Pradesh, I found, among other things, that the value of food produced on these fields had been dismissed as insignificant although it was the basis for food security in the villages.) Without going into the gender issues related to electricity generation, however, here I will look mainly at end usage and some gender issues related to employment in the transmission network, drawing upon experience in related fields.

Grid-electricity – together with other commercial energy sources (e.g. LPG in the domestic sector and diesel in the agricultural and transport sector) – has the potential to influence a wide range of developmental fields, many of which are summarised in Figure 1 of the Background Note (Prayas 2014). Some broad similarities may be discerned with other developmental sectors, such as piped water (where the issues are related to 'last mile' connectivity, the hours of supply, quality and tariffs). Even within the energy sector, however, grid-electricity has very specific characteristics. So, although our experience of other sectors helps to frame questions and sharpen the antennae that we need to identify gender issues related to electricity, lessons from other sectors cannot simply be transferred.

I would first like to draw attention to two broad concerns that are of relevance for gender and development including for the grid-electricity sector: the gendered demarcation of the public and the private spheres; and gendered implications of the interface of technology and the organisation of production. Then, I will briefly review some of the data on women working in the electricity sector. Finally, I will touch upon possible future research questions that could contribute to policy and practice.

I. The Public and the Private

The conventional gendering of spaces, mobility and information is critical across all sectors. Feminist critique has taught us to identify and redefine such divisions in order to transform women's lives. The transformative potential of electricity in this respect is greater than most other energy sources through, for example, improving women's security in public spaces and increasing awareness.

Security and public spaces

Figure 1 in the Background Note includes 'safety and security' under 'Community Enablers'. There is evidence that reliable lighting of streets and other outdoor areas improves security for women and alters the gendered use of public spaces. Domestic electricity is also important for women's security: hence, connections to women-headed rural households in particular

should be a policy priority. (Solar energy has been suggested as a possible source for areas where the electric grid does not reach, or where a back-up is required.)

Information and entertainment

Figure 1 in the Background Note includes 'awareness' under 'Health' but electricity also opens up many arenas to which girls, women and the elderly (who are more home-bound) may not have had access earlier. In the 1970s when television was being introduced, there used to be one TV set in the village *chaupal* or other meeting place, and only men and children would gather there to watch. Casual observation confirms that for rural and urban households that are just emerging out of subsistence poverty, the first use of electricity (after lighting) is for entertainment and communication: mainly for household television (also sometimes radio and other audio devices) and increasingly for charging mobile phones. Although the programme and advertising content of TV may be greatly gender-biased – and therefore needs to be independently monitored – there is little doubt that broadcast media is increasing women's awareness of the world around. (The potential of community radio needs far more attention than it has thus far received.)

II. Technology and the organisation of production

Feminist political ecology has given us the insight that developmental inputs cannot be viewed in isolation, and that technologies cannot be addressed separately from the organisation of production in particular household, community and socio-political contexts. The gender concerns of grid-electricity have to be addressed in conjunction with:

- the *technology* - often, it is the technology rather than the energy source itself which is gender-biased; and

- the *organisation of production* that electricity facilitates (or requires?).

There are many areas that one could look at under the cluster of 'gender-electricity-technology-organisation of production'. The two that interest me are: first, the case of commercially-operated electric grinding machines, which impinges on women's health and the division of family labour ('better living conditions' in the Background Note Figure 1); and second, the case of factory-based electric tailoring machines, which impinges on women's

livelihoods in a global commodity chain ('expansion of economic activity' in Background Note Figure 1).

Labour and health: The case of Electric grinding machines

Among the most significant impacts of electricity on women's domestic drudgery has been the introduction of commercially-operated electric grinding machines for grain, pulses and spices. In a small study that I did in 1979 on energy use in a Haryana village, I found that more than half the households were paying to get their grinding done in three recently introduced electric grinding (*chakki)* shops. In the early 1990s, I noticed a similar trend even in remote parts of northeastern India. Wherever there was an electric connection, commercial grinding machines appeared. (But across urban India today, electric grinding shops are closing with the marketing of packaged flour, powdered spices etc. – this too has a gendered aspect.)

In the agricultural context, grinding machines continue to have a role both in reducing women's drudge labour and conserving crop diversity. In dry land areas, millets were the traditional food crop, more nutritious than cereals. But there has been a declining trend in millet cultivation; one major reason is the women's increasing reluctance to process (hand-pound) millets, an exhausting and time-consuming labour. But experiments with electric millet grinders have enabled women's groups (in Tamil Nadu) to process millets more easily. This has a three-fold benefit in terms of women's drudgery-health, family nutrition, and crop conservation.

Electric grinding-machine shops have indeed reduced women's labour and thereby improved their health, but we do not know how and to what extent this has altered household gender roles and responsibilities.

Livelihood diversification: The case of electric tailoring and sewing machines

Traditionally, embroidery and sewing by hand were women's activities. When mechanical sewing machines were introduced, men took over the craft and organisation of tailoring.Women found both hand-driven and foot machines tiresome to operate. However, with the introduction of electric sewing machines, both household-based and factory-based garment production have opened up new livelihood options, especially in Tamil Nadu and

Karnataka. Young women from Odisha are undergoing technical and life skills training and are then transported 1000 kms to work in Bangalore's garment factories (that supply western chains such as GAP). Although underpaid and strictly confined, they say the work (e.g. stitching belts onto jeans) is easy. And that is clearly because of the electrical sewing machines that they operate. In northern India where women are more involved in home-based piece work – adding embroidery, sequins etc. to garments – the role of electricity is for lighting required for close work.

Many of the studies of garment factory-work and livelihood diversification in India, China, or Bangladesh, deal with the conditions of labour but do not deal very much with the technology and not at all with the energy source. But these are all inter-linked and if addressed together would make for a more layered understanding and better policy and practice.

III. Women in the Electricity Sector

The electrical and electronic sector in India is a male world. There are new job opportunities at the technical/organisational level and in the manufacturing of electric and electronic components (although data is very inadequate, we know that large numbers of technically trained women are working at the shop floor in electrical and electronics industries). Openings for graduate engineers in electronics have also increased rapidly. Today, even the Indian Navy and the Indian Army too are recruiting women electrical and electronic engineers.

As I was preparing this Note, the all-India national electricity grid was prominently advertised in the newspapers. That prompted me to look up the Power Grid Corporation of India, which is concerned with the key function of electricity transmission. Not surprisingly, I found very few women in the grid-electricity sector. For instance, its 14-member Board

includes one woman, a former IAS officer; all the technical and finance members are men. In May 2014, of over 130 persons in senior management positions – including regions and subsidiaries – only three are women; and none of them have technical-engineering posts (board and organisational structure as given on the Power Grid website).

To what extent is this gender-skewed pattern of employment reflective of engineering education? Today women in higher education in India may not face a 'chilly climate' in doing engineering (as compared to the US, see Aggarwal 2013). According to a study by Aspiring Minds (National Employability Report: Engineering Graduates: Annual Report 2011, see End Note 1) the ratio of male to female engineers in India was 1.96 – higher than the population ratio of 1.06, and considerably higher than the ratio of male to female engineers in the US, which is 4.61. (The main focus of the study was the IT sector, where it found that the current ratio of women is greater than that of women engineers overall.) The male-female ratio in engineering colleges in Indian states shows some correlation with the overall male-female population ratios in these states but, as the study also suggests, there may be other reasons for fewer women engineers in some states. Kerala is the only state in which the male-female ratio of engineers, 0.85, is tilted in favour of women.

The picture is more nuanced when we look at the trends in different engineering disciplines. Two major studies on women engineers in India have been undertaken by PP Parikh and SP Sukhamate (2004) of IIT Bombay. Their analysis shows that there is greater gender balance in enrolment in the southern states. It also shows that over a nearly 10-year period, the preference for electrical engineering has declined significantly (See End Note 2). These data need updating and further analysis.

IV. Research questions

Researchers working in feminist/ women's studies and energy have to engage with the electric-grid system as it operates in India to identify points of critical intervention. Power generated at various distant locations is fed into the all-India power grid, and transmitted through a high-voltage system to local sub-systems that convert it to lower voltages for consumption by households, communities, businesses etc. There are gendered questions to

be asked at every stage: generation, transmission, distribution, consumption. There may also be gendered questions related to the charges for transmission, distribution, and retail consumption.

The key questions from a gender-perspective (for any technology) would be:

1. Who does what? – categorisation of activities; numbers of women and men in each activity; the reason for these numbers (or lack); how this is viewed by women and men.
2. How do gender roles and relations shape the production and distribution of grid electricity? And conversely how does the technology of grid-electricity shape gender roles and relations?

Feminist technology studies

Some insightful feminist studies in the West have looked at the social shaping of technologies and the impact of electrical technologies on women's lives and work - machines operated by women in industrial workplace settings: e.g. telephone switchboards, electric typesetting and printing machines or in the household: e.g. electric washing machines, ovens. (See for instance Cynthia Cockburn's work). But there are very few similar studies in the Indian context.

An aspect for policy that requires researching is the gendered impact of industrial restructuring since the 1990s under liberalisation and globalisation. Amrita Chhachi's 1997 study of 24 electronics companies in Delhi, reveals that the existing skills of women workers were not recognised as 'significant' and were downgraded, despite a demand for 'technically skilled' women. These are issues that are as yet little discussed and understood.

With the prospect of food, energy and climate change crises converging in the future, there is urgent need to understand the gender-aspects of grid electricity.

References (to be completed)

End Notes

1. Table 1: Male-female ratio in engineering colleges, by States

State	*Male-female ratio*
Kerala	0.85
Andhra	1.44
Karnataka	1.51
Union Territories	1.53
Odisha	1.56
TamilNadu	1.7
Maharashtra	1.76
Haryana	1.85
Rajasthan	1.86
Punjab	2.45
Madhya P	3.12
West Bengal	3.81
Uttarakhand	3.95
*North eastern states	4.58
Gujarat	4.61
*Himachal Pradesh	5.42
Bihar-Jharkhand	7.58
*Jammu Kashmir	9.88

Source: Adapted from histogram (Figure 2 page 14) *Not included by authors in total because of small sample size. The M-F population ratio is 1: http://www.aspiringminds.in/docs/national_employability_report_engineers_2011.pdf accessed 15 Aug. 2014

2. Women Engineers in India, extracted from Parikh and Sukhatme (2004)

Study I showed that in 1990, Kerala had the largest number of women engineers in the country, followed by Tamil Nadu, Karnataka and Maharashtra, the numbers being about 20, 18, 16and 12 per cent of the total respectively. Discipline wise, electrical engineering and electronics were the most preferred branches followed by civil engineering. There was also some indication that although the computer science/engineering population was low, it had started to grow rapidly.

Study II showed that for the years 1994 to 1998, these four states still produced the largest number of women engineers. Discipline wise, electronics was the most preferred branch for the five years of Study II, with about 37 per cent of the graduates. Electronics was followed by civil engineering, computer science/engineering and electrical engineering, each being about 16-20 per cent of the total (Table below). A significant drop in preference for civil engineering and electrical engineering and spectacular increase of preference for electronics engineering and computer science/engineering needs to be underlined.

Table : Branch-wise Distribution of Women Engineers

Branch	*Study I(Per Cent)*	*Study II (Per Cent)*
Civil engineering	26.4	19.7
Computer science/engineering	6.2	17.8
Electrical engineering	32.5	16.1
Electronics engineering	30.4	37.1
Mechanical engineering	4.5	9.3

Source: Parikh and Sukhatme (1992, 2002).

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Grid-based electrification to increase women mobility and access to labour markets

Note for the round table on Gender and Electricity, New Delhi, September 26, 2014
Tejal Kanitkar, Centre for Climate Change and Sustainability Studies, TISS - Mumbai

The discussion on energy access has received an impetus at different times for different reasons. In India in the 1970s and 1980s the focus on pump-set electrification was driven by a demand for increasing the area under irrigation. In the 1970s, the focus on the use of biomass as the 'poor man's fuel' was driven by the oil crises and the resulting increases in prices for domestic cooking gas. An increased focus on improved cook stoves as well as modern biomass gasification units was a result of the policies of this time. In the 1990s and 2000s, the focus has primarily been on household electrification through grid and non-grid solutions. The discussion on rural electrification has been shaped by both, the imperatives of achieving millennium development goals (in which access to electricity was not included directly) as well as the discussion in international forums on India's role and contribution to climate change mitigation vis-à-vis the challenges it faces domestically in ensuring energy access for all. All programs and plans driven by these different concerns at different times have had mixed results. While all of these efforts cannot be dismissed as unsuccessful, it is also true that access to energy especially in rural India still remains a major problem.

It is necessary to evaluate why this is so. Have we not addressed the issue adequately, in terms of a firm rural energy policy and implementation program with adequate funds? Have we failed to adequately understand the drivers of energy access and so have only been addressing the issue partially? And who has this failure affected the most? The gender dimensions of energy access have been discussed at length in the literature on energy access. Most studies focus on energy access for cooking as that is undoubtedly the aspect of energy access that affects women's health, livelihood and life in the most direct manner. Electricity on the other hand, is a good that is non-rival in nature - its benefits for women cannot be separated from its benefits for other members of the household. Even so, electricity can potentially play an important role in the process of social transformation especially for women.

The question then remains of what electricity access entails in a gender specific context. Is the provision of household connections at subsidized rates for a basic consumption of 30 units/month (2, 60 Watt light bulbs working for approximately 8 hours/day) a substantial step towards ensuring women's empowerment or gender equity? The absurdity of such a proposition underlines the fact that the larger question of gender equity cannot be addressed by piecemeal solutions of technological intervention. However, neither can they be addressed

simply by improving education and awareness among communities. For women to be truly empowered there must be opportunities created for them in the labour market in addition to facilitating conditions at home for their mobility. While an expansion of the grid to create employment for both men and women is an urgent necessity, the role of such an expansion to also fulfil the latter objective cannot be stressed enough.

Let us briefly deal with the first goal first – creating opportunities for employment, i.e. expanding the labour market for women. In the first instance, for rural India, labour absorption of women in agriculture is very high (about 55-66%[1]). Increase in the area under irrigated agriculture has been known to increase labour absorption in agriculture at all levels. i.e. from labour intensive operations undertaken by women (such as weeding, planting etc.) to an increased use of machinery on farms[2]. Apart from an increase in the coverage of surface irrigation schemes, electrification of pump-sets and the provision of access to the same to small and marginal land holders can potentially increase employment opportunities for women outside the household. On the other hand, an increase in the productivity of agriculture would also mean an increase in the production and availability of agricultural residue (which is used very often as a substitute for firewood especially in post-harvest seasons). So an indirect benefit in terms of the reduction of drudgery related to fuel wood collection cannot be discounted. The availability of more stable incomes, agricultural or non-agricultural (but mostly the latter) is a strong driver for the shift from traditional sources of fuel to more modern sources of fuel, thus directly impacting women's lives[3]. It also paves the way for an increased use of appliances in the home. This is not achieved merely by 'higher incomes', especially if those incomes are unstable. Stability of income comes from the availability of diverse employment opportunities in the region made possible by many factors, energy infrastructure being one of the most important ones.

Access to a basic minimum amount of energy is definitely necessary but cannot be considered as the harbinger of social change for women. The shift to machinery from manual labour for various chores even within the household is necessary to facilitate mobility of women outside the house for various reasons. So while providing electricity connections to households can be the first step towards ensuring inclusion, especially in rural areas, a stronger focus is needed on reliable supply of electricity and assured long term connectivity in both rural and urban areas. An active encouragement and incentive structure for the use of certain technologies within the

[1] National Commission for Women, New Delhi,

[2] Women Workers in Agriculture: Expanding Responsibilities and Shrinking Opportunities, ILO, Asia-Pacific Working Paper Series

[3] Results of the survey in four villages by the Centre for Climate Change and Sustainability Studies. Paper currently under review

households is necessary to ensure that women' s time is freed up for other engagements. Appliances such as mixers and grinders in the first instance and refrigerators and washing machines in the next can be areas of major focus. The secondary markets for these appliances in the first and second tier cities is high, however their penetration among lower income groups all over India and especially in smaller towns and villages is very low. A transition to these high end appliances for household chores will not be possible in the absence of a reliable electricity supply system. If therefore, the relationship between gender and electricity is to be explored seriously, it is necessary to objectively examine the need for the expansion of grid-based electricity.

In the context of climate change mitigation, there is an increased focus on promoting decentralized electricity generation systems in villages. While this can be an immediate solution for the provision of access to households, it cannot be at our current stage of development, a permanent solution for energy provision to households even in remote villages. A change in the material conditions of production and work are required to engender a process of social transformation that can lead to empowerment and equity for women.

Gender and electricity: some thoughts on end-use, sustainability and technology

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These are initial thoughts about gender and electricity that are locatable under the broad framework of gender and science-technology. I use the term gender rather than women, to step away from the common usage of the latter as a descriptive rather than an analytic category. For one, such a usage fails to take into account the diverse and contradictory experiences of women vis-à-vis science and other dominant discourses; for another, it does not account for the ***effects of gender*** as played out in texts, institutions and practices, that impact, in different ways, the lives of people all along the gender spectrum, including women and men.

The framework of gender and science-technology brings multiple elements to the table. Firstly, it points to science-technology as a male, masculinist domain that excludes, to differing degrees, all who do not fit the norm of science as a reasonable, objective and exact activity. Secondly, it identifies science-technology as related; these have traditionally been seen as distinct, either with science being the [pure] theory and technology the [contaminated] practice, or technology being an independent, sometimes pre-modern or non-modern proletarian activity unfettered by the elitism of scientific theory. Science studies and feminist science studies scholars have shown these to be rather a hyphenated term, sometimes referred to as technoscience [Latour], that is not neutral, that is produced within relations of power with the state, market, and communities, among other actors. For the purposes of the present discussion, then, electricity is more than a neutral source of energy, and questions of policy, generation, distribution, end-use, and control over end-use become fraught with questions of power. What the gender-science framework alerts us to is that this is not a question of access or distribution alone but also the contexts within which knowledge of energy generation are understood.

Another related element that the gender and science framework provides is a recognition of the dualist nature of the scientific enterprise. Reason-nature, Man-woman, Masculine-feminine, Culture-nature, Modernity-tradition are only one part of an extensive list that frames ways of modern life, where the second element in the binary is considered the inferior term. An attachment of these second terms follows, to create certain stereotypes of women, for instance, as nurturers, householders, mothers, bearers of tradition, conservers of nature. What further follows is that these second terms fail to qualify as legitimate or equal claimants to modernity or mainstream development. Translated into current development language, this would mean an expectation of poor rural women, for instance, to be practitioners of sustainable sources of energy, even with rural electrification on the agenda. The implications for empowerment are clear.

Following on the above background, I would like to pose four points for discussion. There have been studies that seek to disaggregate the data on household electrification and end-use; the background note also refers to this. Alongside the question of what uses of electricity get prioritized in a household, owing to the lower premium on women's work as well as the gendered division of labour, however [cable TV over water, even though the former is more expensive], it is pertinent to determine which are the households that find mention. Where on the poverty chart are female-headed households that struggle to get put

on the electricity grid? What are the degrees of empowerment available to women within such households [discussion on control over resources and access more often focuses on male-headed households]? Some of these questions will also have implications for the definition “female-headed” as well.

This leads us to the next question – which women find mention in the discussions on access? Put more robustly, who on the gender spectrum gets left behind? Given that the able-bodied, reproducing, upper caste cis-woman within the heterosexual family is the constituency that is at least visible in most discussions, what of the widow, the single woman, the pavement-dweller [who does not qualify as slum-dweller], the homeless woman, the woman outside the heterosexual family structure? Clearly, even this short list has implications for the category ‘women’ , and for the purposes of this discussion, it might be suggested that a conflation of household with conventional families with the heterosexual couple as the primary unit might be a framing problem that is even more insidious than the stereotyping of women within these. Partly following on this, working with public space alongside households might be one way to focus on empowerment of people along the gender spectrum who live both within and outside these households.

About the question of gender, space and electricity. I would suggest that there are important interconnections between each of the strands mentioned in the background note, particularly questions of community enablement and access to education, for instance. There is work that talks of control over end-use, location of power points within the household etc. Some of this work could be followed up on to further nuance available data. Where, for instance, is the ubiquitous TV? Do children have access to alternate spaces for study within a household with a premium on TV watching for the adults? Does the girl child have equal access to these spaces? If she is drafted into household work or cooking during the evenings [given the gendered division of labour], does she have access to these spaces for study in later hours, which would mean higher electricity bills for the household? This is a pointer at some of the work that would help nuance available data.

But there is a further question here, and that is of ***links between different kinds of empowerment*** that electrification makes possible. Take the case of street lights and education. In terms of longer study hours, and access to quieter spaces, the image of the child under the street lamps is a known and evocative one. Of course the image is also a gendered one, of a male child who is able to overcome adversity by accessing that which is available. This recognition of the image as gendered helps realize, if through a hypothetical example in the context of a larger challenge, that the access to education and the access to safety through street lighting, as well as attitudinal shifts that can help lift the gendering of the public-private, are linked, and need to ***converge*** in terms of policy and implementation. This translates, for different children accessing public space for education, into the mobility that is linked with at least the sense of safety that street electrification provides – be it bus stops, subways, or the street outside home. Gender budgeting documents at the state level have been speaking of convergence between government departments for a while now; this might be a good time to remind policymakers of the promise, and word recommendations accordingly.

A fourth question that I would put to discussion is the question and stereotype of sustainability. There is work in the premier science institutions of the country that focuses on sustainable and renewable sources of energy and technology, and women's roles in these. Of the work available that speaks of women, biogas management and smokeless chulhas feature prominently. We have spoken of stereotypes. But the question I would like to pose is – how does mainstream development reconcile questions of sustainability? In our concern with empowerment for people at different points along the gender spectrum, will we keep the debate at the level of equitable distribution, access and control over end-use, or will we also step behind to look at sources of energy generation and attempt to find a way to access different knowledge models of energy generation while still refusing stereotypes?

Influence of Intra-household Dynamics on Gender and Energy Poverty[1]

Shirish Sinha[2]

1. Introduction

Alleviating energy poverty by enhancing access to modern energy carriers has topped the agenda of national governments. The debate, so far, on energy and development has mainly focused on the macro- (national aggregate) level while neglecting the impacts of the energy - development linkage on the micro-level. However, on the micro-level, that is the level of households, these linkages are far from obvious because the connection between limited access to modern energy carriers and the broader issue of development are interconnected in diverse, direct and indirect, complex ways that are not fully understood. At the household level, the linkages are complex in that improvements in energy access do not automatically translate to an increase in aggregate income or vice versa. Factors such as location, economic development, infrastructure and social norms, including gender, also affect energy access (Clancy et al., 2011). The linkages become even more complex because of differing, and at times conflicting, priorities set by the various members of a household, since these influence decision-making including choices about energy carriers. Relationship between wellbeing of women and men and alleviating energy poverty suffers from weak empirical evidence. The linkages are far from clear because the links between limited access to modern energy carriers such as electricity and the well-being of women and men are not fully understood. Here, gender relationships have an impact since these influence decision-making including choices about energy carriers. This discussion note, draws from case-studies from three energy deficit regions of India, attempts to provide empirical evidence of the intra-household dynamics influencing energy access as determinant of energy poverty.

At the household levels, the inequality in energy access forms another dimension of energy and development. This inequality is at two levels. Firstly, at the village level, only a few households have access to modern energy carriers and the majority have no access. To a large extent this can be viewed as the outcome of supply side orientation of interventions by a government with limited budgetary resources and hence unable to create universal access. Secondly, at the household level, there are intra-household dynamics including the gendered division of roles and responsibilities, which usually places the responsibility for household energy provision on women and girls (Sinha, 2012).

2. Energy Poverty

There is no internationally agreed definition of energy poverty. However, a frequently cited definition is "the absence of sufficient choice in accessing adequate, affordable, reliable, high quality, safe and environmentally benign energy services to support economic and human

[1] This discussion note is drawn from author's doctoral dissertation: In Pursuit of a Light Bulb and a Smokeless Kitchen: Longitudinal Analysis of Role of Energy Sector Policies to Alleviate Rural Energy Poverty in India. The thesis can be accessed from https://doc.utwente.nl/83256

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development" (Reddy, 2000, p 44). This definition of energy poverty provides a broader perspective on the issues of availability and affordability, and emphasises the ability to choose the form of energy for any specific end use. The definition also envisages an idealised situation and assumes that people are rational and use energy according to their paying capacity.

An alternative approach to understanding energy poverty would be to view it from the perspective of household energy security. Household energy security would include the basic minimum energy needed daily to cook sufficient food to meet nutritional needs, to boil enough water for drinking and hygiene, and to generate adequate lighting that allows people to extend their household activities beyond daylight hours for consumptive and productive end-uses. Below this level, a household can be considered to be in the state of energy poverty (Clancy, 2011).

Reflecting on the attempts made to define energy poverty and the approaches used in the literature to measure energy poverty, a pragmatic way to define energy poverty could be in terms of low-capacity end-users access, viewed as a function of availability and affordability, to energy services. This definition of energy poverty is reinforced by the inclusion of links between energy access, gender and poverty that enhance the capability of low-capacity end-users to improve their quality of life. The issue of energy poverty can also be viewed from the perspective of capability: access to modern energy carriers enables the capability of people to move out of poverty. Energy poverty, when approached from the 'access' perspective, focuses on an individual's capacity and capability to have a quality life. Energy poverty can therefore be defined as: '*a reasonable quality of life can be conceptualised as a life free of factors such as indoor air pollution that affect health, having adequate nourishment from cooked food and safe drinking water, being informed and knowledgeable about social and economic development including access to price information, and enjoying personal security through improved illumination*' (Sinha, 2012).

3. Energy - Gender Linkage

Poverty related to access to energy has a particular gender[3] dimension. Energy and gender are linked in many diverse ways, particularly through the nature of the energy resource base, characteristics of the household and community economies, features of energy policy, and the socially determined position of women in the household and in society. Energy services based on modern energy and improved technologies have the potential to positively influence two specific aspects of women's and men's lives: time-use, with its links to reduction in drudgery and improvements in wellbeing, and economic opportunities. These two issues are linked.

The continued use of traditional forms of energy carriers is associated with an undervaluation of women's time by the household. The linkage between the time that women spend collecting traditional forms of energy carriers and time spent in managing household energy has been neglected for many years in policy planning as well as in energy policy implementation. Energy

[3] Gender is a concept that refers to a system of socially defined roles, privileges, attributes and relationships between men and women that are learned rather than biologically determined. Gender cuts across social identity, intersecting with a range of other identities including class, race and ethnicity, age, religion and family structures. Gender roles are not universal nor are they static: they vary in degree from society to society and change over time (Clancy, 2011).

is a critical input at the household level, especially in the daily lives of women who need energy for their household activities such as cooking and space heating, for access to clean and safe drinking water, for activities associated with agriculture including post-harvest processing, and for commercial end-uses such as milling and activities that require process heat. Limited access to modern energy carriers has a disproportionate effect on women and girls because, in most societies, they carry the responsibility for household energy provision for the services energy provides for a family's wellbeing (Dutta and Oparaocha, 2010). In the absence of access to modern energy carriers and the services they provide, women devote long hours to unpaid household and farming tasks, leaving little time for other activities including recreation and leisure.

The energy–gender[4] linkage encompasses the differences in the way energy is perceived by men and by women. Historically, issues related to energy access have been regarded as the preserve of men, and the differences between men and women, and between boys and girls, with regard to access and control over energy resources have not been recognised. In fact, most of the early discourses on gender and energy were limited to women and energy with a focus on traditional energy fuels and devices (cook stoves, for example, were prominent). However, the emerging paradigm of gender and development served to extend the linkages to demand-side issues, and later it encompassed a broader range of issues including pricing, transport and modern energy carriers. Men and women not only have different energy needs based on the gender division of labour but also different access to resources and decision-making processes to satisfy those needs (Clancy et al., 2003).

The gender inequality in energy access is part of the gender inequalities prevalent in society and within households. An important understanding of intra-household dynamics and negotiations can be drawn from argument of cooperative conflict, which captures gender inequality within the family and ultimately in society at large. Extending the idea of cooperative conflict to energy access, it can be argued that enhanced access to modern energy might in itself contribute to changing power relationships at the household level (Sinha, 2012). Decision-making in homes and at the community level places monetary decisions and control in the hands of men: women have less access to productive resources as well as to education, training and information. The gendered division of labour in the household makes women responsible for household energy provision. However, even when an energy type or energy technology that is predominantly of direct relevance to women (for example in their traditional role in cooking) is to be bought, men enter the decision making process (Dutta and Oparaocha, 2010).

Another negative aspect of the limited transition to modern energy carriers concerns the trade-off between investing in time-saving energy carriers and the unpaid labour of women and children (especially girls). The argument for providing modern energy carriers is often linked to their adoption for economically productive purposes. However, the productive activities targeted tend to be those of men, for example agriculture, where the involvement of women is restricted to labour and constrained by the lack of land ownership.

[4] Despite efforts to move the debate on from women in development to gender and development, gender issues have largely been concerned with women, particularly women as a subordinated group.

Despite concerns about the complexity of such interrelationships and the acknowledgement of the importance of including women's and men's interests, and needs, in energy policies and programmes, gender analysis has been largely excluded. The emerging approaches to energy policy increasingly emphasise access to modern energy for energy services from an equity perspective, and the need to ensure that energy security enables low-capacity end-users to access modern energy. Within this emerging policy context, there is no place for social and cultural limits on the opportunity cost of women's labour; the emerging policy, for example, seeks to promote those end-uses of commercial energy that directly increase women's productivity in income-generating activities (Kelkar and Nathan, 2005). The resulting increase in the opportunity cost of women's labour is predicted to promote household adoption of improved biomass technologies, the commercialisation of fuels, and a switch to modern cleaner fuels with their attendant health benefits. Clancy et al., (2011) have argued that the lack of attention to gender in energy sector policy can be attributed to three reasons. First, the lack of gender-disaggregated data. Second, the lack of awareness of the benefits to be gained from incorporating gender analysis in energy policy and project design. Third, the energy sector lacks knowledge on gender mainstreaming.

4. Understanding Energy Access: evidence of intra-household dynamics

The evidence of the intra-household dynamics on energy access is based on three case studies, which looked at energy access at the household level in rural areas of: West Bengal (Sundarbans), Odisha (Kalahandi) and Chattisgarh (Bastar). Access to modern energy carriers was influenced by availability and affordability factors; and intra-household dynamics also played a crucial role in influencing access.

Across households, the influence of gender roles and energy, when it comes to decision-making over purchasing, or shifting to, modern energy carriers, could be found. The analysis shows that the changes affecting the rural households, and the participation of women in income-earning activities, have played a role in the adoption of modern energy carriers for cooking and lighting, but not always. Lifestyle changes in all three case studies were found to influence demand for modern energy carriers. A woman's involvement in income-earning activities does not mean that they can automatically spend the money on buying modern energy carriers; decisions on such purchases are not determined by contributions to household income but on joint prioritisation and household decisions.

The emergence of the middle-income class, initiated a transformation in gender roles and relationships. An analysis of the household level data on having a woman involved in income-generating activities showed that additional income is not a prerequisite for switching to modern energy carriers, at least when it comes to cooking. To make the transition to modern energy carriers requires a reliable and continuous source of income, a situation enjoyed by working women in few households. At the household level, in those houses where there is a steady source of income from either one or more occupations, households are able to use their growing economic status to access combination of modern energy carriers. There are evidence of such households who not only have the economic capabilities to use modern energy carriers, but have also spent additional amounts on acquiring either a solar PV system or a battery inverter to increase their access to energy services. Having a sufficient level of income also allows the purchase of multiple energy carriers to ensure continuity of energy service. However, the energy

carrier choice is quite dynamic where multiple energy carriers are available and household shift backwards and forwards depending upon the context in which the energy is to be used.
In few households, women's participation in income-earning activities did influence the decision to acquire electricity and modern fuels for cooking. In some households, the current levels of income are sufficient to generate a surplus that can be spent on activities, such as leisure, and goods that go beyond mere subsistence. In few households, increasing the leisure time available to both men and women by using electricity and modern fuels for cooking was a valuable objective in itself.

In the case of low income households, there is a considerable blurring of gender roles in terms of contributing to household finance. The majority of working women in these households had low and variable incomes (from farm and non-farm labour) and this level of earnings is often insufficient to meet a household's daily needs and makes it impossible to accumulate sufficient financial assets to enable a switch to modern energy carriers – both in terms of upfront and then operating costs. In these households where women were involved in paid work, the use of modern energy carriers was restricted to electricity. These households have electricity because of the special government programmes, and so the involvement of women in income-earning activities has no direct bearing on access to electricity. However, in the case of low-income households where women are engaged in income-generating activities, there is an increasing trend towards purchase a large portion of their biomass fuels, rather than gathering them for free. A key factor for this can be seen as both a timesaving strategy and a reflection of an increase in the opportunity cost of women's labour. This was mostly true for transition to modern energy for cooking and not for electricity.

Some elements of the decision-making over the adoption of modern energy carriers depending on intra-household power relationships and where the decision-making authority rests were visible across three case studies. It was found that even if women are working, and earning a good income, it does not mean that they can spend the money on buying modern energy carriers since such decisions are not dependent on their contribution to the household economy but on intra-household roles in decision-making. The decisions on such purchases are not determined by contributions to household income but on joint prioritisation and household decisions. As an example, the women members of a self-help group involved in trading agricultural commodities in Odisha said that they prefer to use the money they earn for personal items. None of these women had invested in modern energy carriers, nor did they plan to invest, since they felt this would require a decision to be taken by their husband. As such, women's involvement in income-earning activities does not seem to be a sufficient condition to ensure a shift to modern energy carriers. While it has been argued that women's economic empowerment, for example through paid work outside the home, can lead to a change in their status in the home, including increasing their influence in decision-making about major purchases including energy carriers; this appears not to have happened across three case studies. In practice, it was found that often men who had the final say, including about purchasing items that fit within the traditional spheres of women's influence such as the kitchen.

Further, there is a strong gender-division in intra-household decision-making; based on the traditional roles in which men's responsibility is to earn and provide for the family's welfare, and women's responsibility is to take care of the home. As such, energy procurement and use have

distinct gender dimensions. The procurement of fuelwood is the responsibility of the women in a household but, when it comes to modern energy carriers, the connections (electricity and LPG) are in the name of the male head of the family. In some households, energy decisions, and especially for purchase of modern fuels for cooking, is a joint decision but in most cases for electricity access the decision, as well as payments, are made by the men in the family.

5. Questions for discussion

The discussion note, based on experience of studies across three case studies and rural households, presented some evidence of the intra-household dynamics and dimensions influencing energy access and how they are affecting the gender-energy linkages. The influence of gender on intra-household decision-making related to energy is not, as is often contended, based on economic status. There are non-economic factors which influences the decision-making. Gender relations need to be seen in the broader background of the prevailing class systems, of society at large and the cooperative conflict of congruent and conflicting interests in a household.

a) The gender-energy discourse so far has focused on energy access/energy security at household level. What is the advantage of further disaggregating this and separately look at linkages between gender (read women) and electricity access?

b) How can policy makers be motivated to make the decisions in terms of improving modern energy access to ensure low-capacity end-users do not live in energy poverty by taking into consideration the intra-household level dynamics?

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