

The Gender Factor in Political Economy of Energy Sector Dynamics

Scoping study report

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Summary

This research proposal is based on the premise that it is necessary to include gender concerns in the political economy of energy access. In addition to a structural analysis of power in conventional concerns of political economy, we underscore the need for a gender analysis of political and economic processes to understand the strategic energy needs of rural women and men, who have experienced marginalization and exclusion in the development of energy infrastructure. The central research question is: how can rural women be empowered to gain access to modern energy services in both production and social reproduction? In our study of areas in India and Nepal, our analysis will rely on a mixture of qualitative and quantitative techniques and will take place at three levels: i) **Macro**, where the formulation of energy policies and programmes by central and state governments takes place; ii) **Meso**, where energy policies are implemented and administered by networks of the state, market and community and social norms that influence energy policies and practices; and iii) **Micro**, where energy services are delivered and used at the household level and where social norms define women's access to and use of energy. These three levels cannot be looked at in isolation, but must be viewed in terms of their interaction in energy policy and practice. Importantly, women's agency, through organizations of groups of women (SHGs and SCGs) and individually, will be looked at to see how they can influence both energy policy and practice. Throughout the research period, an effort will be to encourage government agencies and development partners as well as the private sector to recognize the potential of rural indigenous women, to engage with their experience and give them a voice in policy formulation, project design and the implementation of energy policies and programmes.

Colophon

Scoping Study Report RA3 The Gender Factor in Political Economy of Energy Sector Dynamics, ENERGIA GENDER AND ENERGY RESEARCH PROGRAMME; Building the evidence base for improving energy interventions' effectiveness by taking a gender analysis approach

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1 Introduction

The current wave of discussions on Sustainable Energy for All (SE4ALL) and on dealing with increased social and gender inequalities as part of the discourse on sustainable development goals has brought forth a surge of reflections on the social norms that influence structures and processes of political and economic development. More recently, the member states have agreed to ensure access to affordable, reliable, sustainable and modern energy for all, with a commitment to “work for a significant increase in investments to close the gender gap and strengthen support institutions in relation to gender equality and the empowerment of women at global, regional and national levels” (UN Outcome Document, August 2, 2015).

These policy commitments are complemented by the aspirational political goals of the Sustainable Energy for All initiative. In brief, these include three critical objectives: (1) ensuring universal access to modern energy services; (2) doubling the global rate of improvement in energy efficiency; and (3) doubling the share of renewable energy in the global energy mix (SE4ALL, 2012). The 2012 Secretary General’s High Level Group on Sustainable Energy for All emphasized the need to work together with civil society organizations, academic institutions, and individual experts to influence policy processes and implementation, and thereby increase the impact of research results. Another global effort to advance clean energy technology is the Clean Energy Ministerial (CEM) set up in July 2012, with three focus areas: (1) improve energy efficiency worldwide; (2) enhance clean energy supply; and (3) expand clean energy access. An important initiative of the CEM is ‘Clean Energy Education and Empowerment’ with the purpose of connecting young women globally around clean energy issues and to support women’s employment and leadership positions in energy governance (<http://www.cleanenergyministerial.org>, accessed on April 4, 2015).

Evidently, there is increasing recognition that energy can play an important role in combating poverty and reducing inequality through (1) improved health, with reduction in the use of biomass for cooking, thereby reducing indoor air pollution; (2) increased productivity through the mechanization of agricultural production activities using diesel engines and electricity; and (3) reduction of labour and time spent on household activities, where the saved time can be used for income generation or leisure needed for rest and recuperation (UNDP, 2006; Clancy et al., 2011).

Largely as a result of ENERGIA’s concerted efforts at mainstreaming gender in energy, modern energy has come to be seen as a critical need in the daily lives of rural women, who need modern energy to reduce drudgery (to facilitate cooking with clean fuels and grain milling, for example) and to increase their productivity and income in agriculture and rural industry (Kelkar and Nathan, 2005; Clancy and Kelkar, 2006; Kelkar, 2007; Cecelski and Dutta, 2011).

Globally, women’s persistent inequality in the political economy is reflected in the pervasively gendered systems of ownership of productive assets and property, financial services, time use, and access to energy. Substantive equality in gender relations requires the transformation of institutions and structures (UN Women, 2015). Such transformative change requires policy and action on the following fronts: (1) redressing women’s disadvantage in political economy processes with changes in policy and practice; (2) addressing stereotyping and the social norms that enable gender-based violence; (3) strengthening women’s agency, voice and participation, and supporting women’s organizations to influence economic (and technology) policy making (Elson, 2014).

A quick review of South Asian countries shows that gender mainstreaming of the energy sector has been introduced in recent policies. However, this has been accompanied by non-implementation and disregard for gender specific energy needs (ENERGIA, 2015; Kelkar, 2014). There are large urban-

rural gaps in modern energy access and use with respect to both electricity and LPG, and non-solid and non-indoor polluting fuels in general. These gaps affect women more than men, as women rarely use modern energy in their production and social reproduction (domestic cooking and care) activities. Women in remote areas are additionally disadvantaged on account of poor infrastructure, which restricts the possibility of developing market-based economic activities. Areas that are poorly connected by roads and other infrastructure have low levels of market-based economic activities, low electricity availability and high use of fuelwood for cooking; together, these factors lead to poor economic, educational and health outcomes.

Our research was conducted in India (Koraput district in the state of Odisha) and Nepal (Kailali district). The three major tasks that take up a great deal of women's time in the two research countries included: cooking and caring for the household, including fuelwood and water collection; agricultural work in the field; and running small businesses at the doorstep or close to home in the village. Improved cook stoves and some agricultural equipment for women's farm work (such as planting, seeding, weeding and harvesting) are available but social norms about women's work have blocked their adoption (World Bank, 2008).

In contributing to the goal of SE4ALL, our overall research objective is to determine whether gendering political economy analysis can help us to better understand the factors that constrain or facilitate women's access to energy in social reproduction and production, and also to explore how women's access to energy can significantly improve their agential power both within the home and outside. In addition, the study seeks to identify the likely trends and pathways leading to women's agential power or empowerment with regard to energy access in rural, particularly remote, regions in India and Nepal.

In achieving this research objective, the project attempts to analyse how political and economic processes advance or impede gender-responsive energy policy designs, their implementation and administration: what possible measures can governments, private energy operators, business associations and civil society organizations take to ensure that policy design and implementation are gender-responsive?

This research proposal is thus based on the premise that it is necessary to include gender concerns in the political economy of energy access. In addition to a structural analysis of power, we underscore the need for a gender analysis of political and economic processes to understand the strategic energy needs of rural women and men, who have experienced marginalization and exclusion in the development of energy infrastructure. Further, we assume that there is scope for deliberate mobilization and intervention to produce better energy outcomes for women and men. Our analysis is based on linking energy access decisions to two spheres of rural activity: social reproduction and production. Social reproduction includes biological reproduction; the socialization of values; education and skills formation for everyday survival; the acquisition of capacities; and production for household cooking and care. Production in the rural economies of South Asia includes subsistence and market-linked activities in agriculture and small-scale industry. We do not treat these two spheres of work as unconnected, as decisions and changes in one sphere interact with and affect decisions and changes in the other sphere.

The gender analysis of energy access will be undertaken with respect to the political economy of India and Nepal, with specific attention paid to four districts in India and Nepal: Koraput, Mayurbhanj (Odisha), Wayanad (Kerala) and Dindigul (Tamil Nadu) in India; Kailali, Dhading, Rupendehi and Kavre in Nepal. This analysis will be conducted at three levels: macro, meso and micro. It is the interaction of all these three levels that produces the gender outcomes of energy access for women and men. At

the macro-level, we look at the political economy at the country level, in terms of policies and gendered aggregates of energy output, demand and supply. At the meso-level, we review the domains of particular markets (such as for fuel), governance systems and administrative structure, how the functioning of these domains is influenced by existing gender norms, and the role of women's networks that give women agential power (Elson, 1994). At the micro-level, we analyse the nature of decision-making by women and men as individual economic agents within the household. One of the questions we explore is: how are these decisions carried out, are they automatic or deliberative? In automatic thinking, customs and social norms lead to a narrow framing (or boundary setting) of decision-making, with decisions most often falling back on a default option. These, however can be challenged and changed by women's networks and new practices in production and organizing, as well as exogenous factors such as market changes, technology, migration and deliberate action taken by oppressed women and men, which can together bring deliberative thinking into a process of decision-making.

In most emerging and developing countries, including India and Nepal, large numbers of women suffer from income and energy insecurity and income poverty (Kelkar, 2009; Kelkar and Nathan, 2005). The situation is much worse in the two remote areas of Koraput in India, and Kailali in Nepal. In the scoping study phase, we selected these regions dominated by indigenous peoples and other marginalised caste groups, and located in remote regions of the country. Remoteness is characterised by: (1) poor infrastructure and connectivity; (2) a higher incidence of poverty; (3) limited access to electricity; and (4) high usage of wood and crop residue as cooking fuel, leading to adverse health effects for women and children as well as deforestation (Dalberg Global Development Advisors, 2013). However, in order to provide contrasts in degrees of remoteness, in the post-scoping phase, we have planned to examine better-connected and economically developed rural areas and peri-urban areas such as Wayanad in Kerala and Dindigul in Tamil Nadu in India, and Rupandehi in Nepal.

We propose to examine rural areas with varying levels of remoteness, extent of commercialization and market-based economic activities, availability of electricity and fuelwood consumption. We will also review progress in terms of social, and economic development and gender sensitivity in energy access in villages in India and Nepal that have had specific energy interventions, such as the distribution of subsidized LPG stove and cylinders in Andhra Pradesh, India and the micro-hydel and Improved Cook Stoves (ICS) programmes in Nepal.

This study will contribute to understanding the gender factor in energy access and changes therein in different contexts of remote and better-connected rural communities with or without energy-focused programmes. The results of this research study and their widespread diffusion would help to change patterns of energy use by rural women, particularly those in remote areas, through: i) encouraging policy makers to consider the evidence generated by the research in formulating and implementing policies and schemes impacting the livelihoods of poor women and men in remote and other rural areas; and ii) enabling the process of rights-claiming by women to energy access and enhancing their agency through our policy-focused research and evidence-based advocacy with government energy agencies, private sector energy suppliers, women's organizations, civil society groups, indigenous and rural women and men.

Underlying these assumptions is the theory of change informing this study, i.e., increases in women's agency can change patterns of fuel use and lead to women's empowerment and higher productivity. Greater agency, enabling decision-making on fuel-use by women, will increase productivity in agriculture and enterprise and reduce the negative effects of smoke pollution on the health of women and their infants in the domestic sphere. An improvement in women's agency in negotiating

for energy access and overcoming energy constraints is likely to lead to transformational changes in terms of a) adoption of gender-sensitive energy policies and laws and attempts at achieving gender balance in structures of energy governance; b) social awareness about the need for women's access to clean energy for cooking as well as for production in agriculture and home-based industries and enterprises; c) women's increased self-confidence and capacity to negotiate with the state and market agencies to access modern energy infrastructure; and d) changes in gender norms and gender-sensitive concerns about women's ownership and control of productive assets including land, agricultural equipment, as well as unmediated access to institutional credit for production.

The results of this research study will contribute to improving women's position and empowerment through access to modern energy, particularly in remote rural areas. The increased participation of women in energy institutions and implementation of energy policies in the two countries could have ripple effects within the study countries and across other South Asian countries.

2 Background and Methodology for Scoping Phase

Over the past several years, discussions on energy have increasingly drawn attention to a global divide between the North and South, and on the health hazards of cooking with solid fuels such as wood, dung and crop-waste, coal and charcoal (UNDP and WHO, 2009). Within the global South, there is a further divide between urban and rural areas. Close to 95% of the world's people without access to electricity and clean cooking fuels live in rural Africa and Asia (IEA, 2011; UNIDO and UN Women, 2013). It is estimated that some 4.3 million, largely women and children, die every year due to indoor air pollution from cooking with solid fuels (UNDP and WHO, 2009), with about 870,000 deaths per annum in India alone (Dalberg Global Development Advisors, 2015). Agricultural technologies are available, but women and indigenous peoples have generally not had access to them. As women are generally considered marginal and unskilled workers, technology such as tractors and rice hullers are seen as part of the male domain (World Bank, FAO and IFAD, 2008).

Women's marginal access to clean and modern energy has continued despite the fact that the 1979 CEDAW (Convention on Elimination of All Forms of Discrimination Against Women), adopted and committed to by the members of the UN, explicitly refers to women's electricity rights and obligates state parties "to take all appropriate measures to eliminate discrimination against women in rural areas" and ensure these women the right "to enjoy adequate living conditions, particularly in relation to housing, sanitation, electricity and water supply, transport and communications" (CEDAW Article 14.2h).

More recently, the UNIDO Director General Kandeh K. Yumkella observed that lack of attention to gender concerns in energy is likely to have serious consequences for economic opportunities for women: "Without energy, women and girls would continue to spend long hours looking for fuel sources, and will not have jobs" (UNIDO and UNWomen, 2013). Further, in its effort to gender mainstream energy issues, the Asian Development Bank observed that "differences between women and men in household responsibilities, asset ownership and livelihood options mean that there are gender-specific dimensions to energy access that require attention" (ADB, 2012: 57). To achieve Human Development Goals, countries such as India and Nepal need to have policies that ensure safe, clean and affordable energy services to support income growth and the basic energy needs of households.

The two countries, India and Nepal, have made some limited efforts to incorporate gender issues in the formulation of rural energy policies. The challenge, however, has been to introduce effective measures and actions regarding implementation in rural regions, particularly remote and indigenous

peoples' areas. Deeply structured gendered norms and exclusionary attitudes towards women and indigenous peoples have impeded both policy formulation and implementation efforts at various levels.

During the scoping phase, we reviewed the available literature on (1) gender specific energy use both in social reproduction (domestic cooking and care) and production (agriculture and enterprises); (2) existing gender norms in the political economy of energy access and their impact on change or perpetuation of policies and practices of energy use; and (3) feminist analyses of political economy, related to the roles of women and men in operations of power within and outside the home.

In a series of discussions with key individuals and in focus group discussions in the field, we had three iterations of feminist participatory research: (1) repositioning of gender, caste and ethnicity in the analysis of the political economy, in which women struggle alongside men in redressing social marginalization in institutional settings; (2) identifying rural women's voices that could break the silence on women's otherwise untold stories; and (3) the use of the intersection of gender, caste and ethnicity as an analytical tool to enable gender transformational change in the structure of power relations.

Importantly, periodic discussions in the RA3 research team have enabled us to come to a common understanding, reflected in the Scoping Study. These meetings as well as the review of literature on gender in the political economy, both broadened and sharpened our analysis of the gender factor in the political economy of energy.

MSSRF and CRT researchers conducted: i) review of energy policies; ii) interviews with government agencies at the state and district levels; iii) discussions with the private sector (such as cashew industry owners in Koraput, electric vehicle owners and suppliers); iv) energy suppliers; v) individuals in key positions (bankers and local leaders); and vi) focus group discussions with Self Help Groups (SHGs) and Saving and Credit Groups (SCGs). Discussions in these meetings centred on three major questions: i) how formal and informal control is exercised on women's use of clean energy in cooking, farm work and home-based/local industries; ii) what is the response of government agencies and energy institutions on the proposition that access to clean energy is fundamental to health, education and economic development; iii) how social and gender norms in households, communities, markets, and in energy governance institutions influence policymaking and implementation.

3 Review of the Evidence and Latest Developments on the Gender Factor in Political Economy of Energy

3.1 Literature review

In this literature review, we begin by looking at the rural energy situation and related policies in India and Nepal, with special attention paid to the problems of remote rural areas. So far, the main approaches can be described as supply-side, where increasing supply is expected to solve the problem of fuel use, or technocratic, where technology alone is considered the solution, without a consideration of the gender issues or other social conditions in which technology is employed. So far the evidence of high incidence of use of wood and other biomass fuels in rural India and Nepal – 83% of rural households in India (Rehman et al. 2013) and 82.7% in Nepal (UNDP-WHO, 2009 – suggests that these approaches have not been very successful. It is an underlying assumption of this research that part of this failure is due to the non-consideration of a gendered critique of fuel transition from household polluting to clean fuels. The failure of supply-side policies has led to a more nuanced,

political economy approach to understanding problems, such as reducing gender inequalities and improving well-being in remote areas. After setting out the main contours of the political economy, we then discuss its affinity with gender analysis and the way in which the political economy could be gender inclusive, with an important role for power and agency in women's intervention in somewhat indeterminate outcomes.

The gender-inclusive political economy is then applied to the analysis of energy issues at macro, meso and micro levels. This is then developed into a framework for our planned empirical analysis of the interaction between our hypothesized critical explanatory variable of the demand on women's time for production and the extent of commercialization of fuel use. This is followed by a brief review of empirical data to make a preliminary check of the usefulness of the explanatory framework proposed here. The review ends with using this framework to look at the dynamics of changes in fuel use.

3.1.1 Women and the Rural Energy Situation

In developing countries there is a rural-urban gap in access to modern energy (electricity and LPG). This, however, is greater for cooking fuel than for electricity. In India, there was a rural-urban gap of 28 percentage points, i.e., 66% of rural households and 94% of urban households had electricity, as well as 58 percentage points in the use of LPG: only 13% of rural but 71% of urban households had LPG (Rahman et al., 2013). In Nepal, the electricity gap is 56.7 percentage points, with rural access being 34% and urban access 89.7%. Access to modern cooking fuel is 7.3% for rural areas as against 59.8% for urban areas (UNDP and WHO, 2009).

The gaps are even higher in remote rural areas. Incidence of electricity use in Koraput is at less than 50% of households, while it is less than 5% for use of LPG (2011 Census). These figures are extra low for the district as a whole, including the few urban areas within it. In Wayanad District of Kerala, all villages have access to electricity but only 15% of households use LPG.

These modern energy (electricity and LPG) gaps have both regional and gender dimensions. For instance, there are differences between different rural regions of India, even as far as the provision of household electricity is concerned. There is a regional or sub-national dimension to the spread of electricity in India, as national policies are implemented or filtered through state administrative and political processes, resulting in differences between states. Some states, such as Maharashtra, Tamil Nadu, Punjab and Andhra Pradesh have high levels of rural household electricity access, in excess of 90% in 2011, while other states, such as Odisha, Bihar, UP and Chhattisgarh, had rural electricity access below 50% in 2011 (Kale, 2014).

What accounts for these large differences in rural household electricity access in these states? States with high rural electricity access have some features in common. One is that in these states there are strong farmer lobbies that have a stake in rural electrification. From the 1960s (the Maharashtra sugar cooperatives) through the 1970s and 1980s Green Revolution developments in Punjab and Andhra Pradesh, there was a continued development of rural electrification, along with subsidies for use of electricity, chiefly for irrigation through withdrawal of groundwater (Kale, 2014).

The rural lobbies in these states also opposed the moves to privatize electricity distribution and the attendant withdrawal of electricity subsidies. In contrast, Odisha, which had little rural electrification, even by 2011, was the first state to privatize electricity distribution, based on World Bank and DFID support. The ruling elite had long since embraced a policy of mineral-based industrialization, to promote which it provided cheap electricity in urban areas. With little electricity-based rural development, there was no opposition to privatization within the state. .

In all the electricity reform moves in Odisha, promoted by the World Bank and supported by DFID with technical assistance, rural electrification was not adopted as an objective. The electricity reform could thus be declared a success, despite not much improvement in rural electricity access. The recent Deloitte review of DFID's support for power sector reforms in India over 20 years declared, "DFID's programs in all the partner states were largely successful in achieving the intended outputs and outcomes...in Odisha where the distribution companies were privatized, subsidy outflow reduced to nil" (Deloitte, 2015: 4). This statement could be made disregarding the important point that this success did not result in any real change in the outcome of providing electricity to Odisha's rural areas. The reform could have been successful in the narrow sense of improving the financial position of the electricity sector, but such financial success did not result in an improvement in rural access to electricity, in which Odisha still remains among the states at the bottom of the energy ladder. Odisha is unique among the other states in this analysis in having neither a farmers' lobby (as in Punjab) nor a farmer-based middle-caste movement (as in Maharashtra or Tamil Nadu).

More recently, a World Bank report recommended a policy of subsidised electricity distribution in rural areas (World Bank, 2015). Pargal and Banerjee (2014) recommend the earmarking of lower cost electricity, as from NTPC, for rural supply and allocation out of the state budget to make up for any losses suffered by the distribution companies from rural supply.

The first key point from this analysis is that regional differences in the importance or otherwise of a rural development programme, promoted by a farmers' lobby, has affected the implementation of policies on electricity development. In other words, political economy factors, in addition to just technical or economic factors, have an impact on electricity access outcomes.

The second point from this analysis is that movements from below, such as mobilizations on the basis of being lower caste or farmers, can affect electrification policies at the regional level: "In no case was electricity simply provided; where electricity appeared, a politics of development and differentiation was at play" (Kale, 2014: 6). This approach ties up with an analysis of the German universal public health system, where it was pointed out that there was a "bottom up" path to infrastructural development (Mann referred to in Kale, 2014: 11).

Within a scenario of regional differences in rural access to modern energy, women are particularly disadvantaged and at risk for their physical safety from lack of roads, sanitation, safe drinking water and electricity (IDFC Rural Development Network, 2013). Travelling long distances to collect fuelwood and water subjects women to tedious and particularly unsafe routines. In Himachal Pradesh, it is estimated that a rural woman spends 40 hours per month for fuel collection, taking 15 trips, often by foot, for distances over three miles in hill and mountain areas (Sangeeta, 2008). Cooking with solid fuels further exposes them to adverse health conditions from indoor pollution. Fuelwood and water collection has been associated with physical injuries in women, such as spinal damage, complications during pregnancy, and maternal mortality (Kramarae and Spender, 2000).

3.1.2 Policy Inadequacy

In discussions on energy policy it is often assumed that the critical factors in bringing about a rural fuel transition are those of household income and supply. Models of household fuel use place household income as the key factor in promoting the fuel transition. Demand projections for fuelwood and other substitute fuels are made on the basis of changes in consumption patterns, as a result of increase in income and improvements in standards of living. In Munasinghe and Meier (1993) the demand for fuelwood is taken to be a function of household income and the price of fuelwood, with negative elasticities for both factors. Further, the "transition away from reliance on

collected wood as a fuel and toward increased purchase of commercial (often fossil) fuels tends to occur as people's standards of living improve" (Heaps, 1993: 249). A study of gender and energy also held that "[household income] represents the factor that influences the choice of a carrier" (Piana, 2003: 20).

The other type of approach is the supply side or technocratic approach, of just giving away free LPG to poor women in remote areas. But in both India and China, for example, it has been seen that merely providing free modern fuel, such as LPG, for cooking often does not work. An evaluation of a large World Bank programme of distributing LPG stoves and cylinders in the state of Andhra Pradesh in India, pointed out that poor women often sold off their equipment, or did not renew their LPG connections after the initial free supply. Corroborating this, women in rural China also are reported to have said, "... expenditure on items which reduced reproductive toil would always come second to productive, income generating expenditure (Lucas, Barnett and Ding, 2003).

Despite such evidence, India's energy policy documents have continued with these supply side approaches. The 2006 Planning Commission document, for example, mentioned merely the provision of wood lots within one kilometre to reduce the burden of collecting wood (Parikh, 2011). The Planning Commission's more recent 2014 document on 'Power and Energy' makes no mention of the need to reduce dependence on fuelwood (Planning Commission, 2014). It was only in September 2015, that the Indian government took recognition of the need to reduce rural women's use of fuelwood, from the existing 60% of rural households to 5% by 2030. This, however, is due to a concern with reducing the intensity of India's emission of greenhouse gases (GHGs).

The concern with the health of women as users of solid biomass is also now coming into public discussion, with the launch of the government's programme for the better-off to give up their share of LPG subsidies so as to extend the programme in favour of poor women. These are welcome changes, but there has been no discussion on the how to implement programmes to reach these goals. Rather the Government of India continues with the same supply-side policies, expecting that an increase in rural income will eventually lead to a switch to LPG use. The Oil and Energy Minister said, "We want to cover 100% of the population. But we have to keep in mind their affordability and accessibility issues. We hope that a large proportion of the population will avail the facility with the increase in their purchasing power due to economic growth, in the next three years" (Pradhan, 2016, "Government to make LPG available to all in 3 years," *The Economic Times*, 1 Jan 2016).

In Nepal, 50% of the population was reported to have access to electricity in 2013, with high disparity between urban and rural areas (Gurung et al., 2013). In 2014, the government initiated a subsidized programme for renewable technologies, such as mini/micro hydel schemes, biogas, solar systems and wind power, in a bid to improve the situation. The Community Rural Electrification Programme initiated in 2003 has played a crucial role in providing clean energy to the otherwise unreachable households. Through its Rural Energy Subsidy Mechanism of 2013, the policy introduced a specific criterion for identifying and including women in the category of poor ethnic groups. District Development Committees were directed to administer social mobilization schemes along with information diffusion and community education to overcome social norms and caste-based prejudices and encourage the participation of marginalised groups in local development activities. Importantly, to strengthen accountability, civil society groups were assigned the responsibility of social audits for assessing effective implementation of the schemes.

The household sector in Nepal is the largest consumer of energy, mainly biomass (wood, agricultural residue and animal dung). In 2010, 78% of households in Nepal relied on traditional biomass for

cooking (CBS, 2011). Importantly, the number of households that have access to electricity almost doubled from 37% in 2004 to 70% in 2010, but most of the electricity was for lighting.

India's Integrated Energy Policy of 2006 subsidized clean cooking fuel, LPG and kerosene. However, these subsidies benefited the economically better-off, and those in urban rather than rural areas. A randomized evaluation conducted on the effects of subsidized improved cook stoves in rural Odisha found that the scheme had not reached remote rural areas, and the use of improved cook stoves had declined over time because of problems related to inappropriate use and lack of adequate maintenance (Duflo et al., 2008). Agricultural policies have failed to recognize that access to electricity and motorized equipment in farm work, such as pump sets and tractors, can result in saving women's time, reducing manual labour, and freeing up time for income-generation, education and leisure.

In India, the 2006 Rural Electrification Policy provided off-grid solutions to supply electricity to households in remote areas; and the 2009 Remote Village Electrification Programme of the Ministry of New and Renewable Energy (MNRE) announced virtually a full subsidy for electrification of remote villages using renewable energy, where grid extension was thought to be unfeasible or cost effective. Despite these measures the 2011 Census of India noted that close to 45% of rural households lack electricity and as many as 87% of rural households rely on solid bio-mass fuels (wood, crop residues and animal dung) for cooking (Census of India, 2011).

In India, both at the national and state levels, energy policies and schemes are largely framed and implemented as 'gender neutral', but rural women and men have different needs and concerns as well as levels of access and benefits. On these lines, Cecelski (1995; 2003) raised the issue of non-inclusion of feminist perspectives in energy policies and projects during development planning and implementation phases. The study carried out by Soma (2003) proposed a framework for mainstreaming gender into energy policies and programmes. In contrast to India, Nepal has a policy of including women in energy programmes at the district level, and one of their stated goals is to reduce dependence on burning solid biomass through a combination of ICSs and biogas (Pokharel, 2013). For instance, the Alternative Energy Promotion Centre (AEPCC), through various government programs in rural areas introduced 258,000 biogas plants and 620,000 improved cook stoves (AEPCC, 2012). But despite these interventions, biomass continues to be the primary energy source for rural households in Nepal. The analysis of the successes achieved and problems faced by these programmes can provide useful lessons not only for Nepal but for India as well.

3.1.3 Gender Critiques of Rural Energy Policies

But overall, whether in India or Nepal, it must be noted that there is continued dependence on solid biomass fuels, particularly wood, in cooking and in small businesses, such as tea and snack shops. Contrary to the expectations of household income and supply side approaches, it has been observed in that in the rural areas in developing countries (such as China, India, Nepal, Pakistan, and Sri Lanka) even a rise in household income does not see fuel use transition from wood to LPG as sharply as it does in the urban areas of the same countries (see Lucas et al., 2003; Kelkar and Nathan, 1997 for China; Kelkar and Nathan, 2005 for India and Asia; Shakya, 2009 for Nepal; Wickramasinghe, 2011 for Sri Lanka). Some of these studies (Lucas, et al., 2003; and Kelkar and Nathan, 1997; Palit et al., 2014) also argue that the fuel transition is even more restricted in remote rural areas. At the macro level, analysis of India's large-scale National Sample Survey showed that the curve of changes in fuel use relative to household income is much flatter for rural consumption than it is for urban consumption (Kelkar and Nathan, 2005). Palit et al. (2014) in fact state that except for the highest

rural income class, “... there is no real transition in terms of access to modern cooking fuels” (2014: 242). There is access, but what this statement refers to is use.

A key factor that has been identified in these studies as inhibiting the fuel transition is the low opportunity cost of women’s unvalued labour in collecting and using fuelwood. This factor (high opportunity cost) also why programmes to promote household pollution-reducing improved cook stoves are much more effective in China than India, and in more connected and commercially developed areas as against more remote and less commercially developed areas even within China. The low opportunity cost of women’s labour is a key factor inhibiting this transition (Kelkar and Nathan, 1997; Lucas et al., 2003, also Palit et al., 2014). These studies show the limitations of household income or technocratic and supply-side solutions, which have been the dominant approaches to promoting fuel transitions in remote rural areas. It is necessary to go beyond physical access and household income, which is as far as models of energy access and use go.

This is stated in a slightly different manner in Clancy et al: “The value of women’s labour can be the determining factor in fuel switching,” (2011: 30). The value of women’s labour depends on productivity in production or income-earning activities; which becomes the opportunity cost of using it in social reproductive activities, such as collecting wood for fuel or time spent on cooking and cleaning utensils.

Along with a gender analytical approach, attempts have also been made to operationalize the gender approach so that it can be applied in energy projects. From the piecemeal and ad hoc manner of introducing gender into the design and implementation of energy projects, the *Practical Handbook* (2011) of Cecelski and Dutta shows how gender integration or mainstreaming can be carried out in energy projects. This represents the transition from gender analysis to practical gender action.

But this shift also requires the use of additional analytical methods. The gender critique of energy policy, such as in Kelkar and Nathan (1997; 2005) shows that different economic structures summarized in the low or high opportunity cost of labour are related to the success or failure of modern energy systems in remote rural areas of China and India. But how does the opportunity cost of women’s labour move from low to high? Is it dependent on regional economic developments, the spread of commercial production and so on? Or, is it possible for the women in remote areas to undertake any action that could change the structures of opportunity cost and in turn increase the value of women’s labour? The analytical method required to design policies for women to bring about such an economic transition is that of bringing in the politics of projects and policies into the domain of political economy (Hudson and Leftwich, 2014), or, as feminist political economy theory puts it, to bring the agential power of women into the analysis (Sen, 1999; Rai and Wylen, 2014). The key question then becomes: how do women in remote areas gain the political or agential power to change their economic opportunities and, simultaneously or with a lag, their fuel use systems? Answering this question needs the use of a gender inclusive political economy approach.

Before going on to consider the analytical approaches of political economy that has got renewed emphasis because of the limitations of supply-side policies, we briefly set out the developing situation of rural women in India and Nepal. With growth rates being rapid at present, there are many changes taking place in the rural economies of these countries. Women’s roles in the rural economy are changing as a result, and this is the context within which energy policies need to be considered.

3.1.4 Rural Women: Work and Assets

In both India and Nepal, agriculture with smallholder farming is at the centre of rural livelihoods. However, both the countries are experiencing a rise in non-farm and home-based enterprises, such as tailoring, production of flour, dehusking of paddy, processing of cashews, production of pickles, herbs and preservation of meat and milk products and manufacture of wood and textile products and running small shops and food outlets. For over two decades, the establishment and growth of small scale enterprises has been important for high growth in India (Kooijman-van Dijk, 2008: 9). In India 85% of all land is cultivated by small and marginal farmers who own 1 to 2 hectares (or 2.5 to 5 acres) of land. According to the 2011-2012 NSSO 68th Round data, 63% of all women workers are in agriculture with over 74% of rural women in agriculture (NSSO, 2011-2012; MoA, 2012). However, women own a disproportionately small share of land; only 13% of rural women have operational (management) rights to land (Agricultural Census, 2011). This situation is better in Nepal where 39% of women are reported to have landholdings of up to 1 hectare (MoA, 2012).

Rural women have a large presence in household industry. For example, in Koraput, the Odisha State Cashew Development Corporation has established 126 cashew plantations in the peri-urban areas of Jeypore. Close to 40% of rural women are engaged in the non-crop workforce including household industry (Agricultural Census, 2011). Household industry relates to production, processes, services, repair, and the making and selling of goods. In India and Nepal, typical household industries and enterprises in rural areas are: foodstuffs (production of flour, dehusking of paddy, grinding of herbs, preparation and sale of pickles and milk products); beverages (manufacture of liquor, soda water, etc.); textiles (weaving of cotton, jute, silk); wooden products; paper and leather products; and chemical products (paints, colours, inks, etc.). In both countries, as more men migrate to non-farm jobs in urban areas or in other countries (a strong phenomenon in Nepal) women have secured more visible roles, greater decision-making power and access to technology and local markets in rural areas.

In many parts of India and Nepal, there has been a gradual breakdown of traditional caste-based hierarchies and in the associated occupation of 'attached' labour in the case of the Tharu (or Choudhury) people in the Kailali region of Nepal. Surprisingly, this has occurred in tandem with the rise of both regional disparities and the resilience of multi-dimensional poverty. Odisha, for example, is one of the most poverty-affected states in India, with an incidence of 65% for rural poverty in 2011-12 (IDFC Rural Development Network, 2013). Indigenous peoples (called Adivasis or Scheduled Tribes) have been noted for much higher multi-dimensional poverty (in access to education, health care, productive assets and energy infrastructure) and deprivation compared to the rest (Planning Commission, 2013).

We noted four key features of rural dynamics, which need to be considered for our analysis of gender in the political economy of energy. First, there is an increased blurring of urban-rural boundaries. As the recent Census of India shows, 69% of the population (or 833 million people) lives in 220,000 villages (Census, 2011). Of these, larger villages with populations over 5,000 and with roads and market links are rapidly being urbanized, though they are not classified as towns. We noted a similar situation in Kailali, Nepal. These expanded transport and communication networks, such as concrete roads and mobile phones, provide linkages of rural-urban markets as well as changes in norms and attitudes.

Second, the growing purchasing power of rural women and men leads to rising aspirations for a better quality of life and demand for consumer goods. In India, while average rural monthly per capita consumption expenditure remains half that of urban areas (NSSO, 2011-2012), the growth in

rural income is reflected in a sharp drop in income poverty to less than 26% from more than 34% in the two-year period of 2011 – 2013. Along with the rise in rural markets, rural literacy in India increased by 14 percentage points between 2001 and 2011 (IDFC Rural Development Network, 2013), in which the increase is higher for rural women at 26%.

In the case of Nepal, according to the Household Survey-2012/13 and the Household Budget Survey 2008, rural households spend less than half than urban households. However, rural expenditure increased to 18% of national consumption in 2012, which is higher than the percentage in 2008. Similarly, according to the Nepal Living Standards Survey 2003-04, while the literacy rate for urban areas was 73%, it was only 43% for rural areas. The 2009 Nepal Labour Force Survey II showed adult literacy rate at 55.6% (male 70.7%, female 43.3%) demonstrating a gender gap of 27.4 percentage points.

Third, Nepal's high rates of out-migration of men (annual average of 60,000 men, MoLE, 2014/15) is a pervasive feature of the rural economy. This then leads to many changes in the roles of women in the rural economy, enabling them to assert their agency by taking household economic decisions.

Fourth, official energy policies, when implemented, do provide some space for redistributive justice against established social norms and practices, wherein different interest groups – oppositional, status quoist, progressive, bureaucratic, feminist political economists – all engage with each other to negotiate the arenas of contestation and to establish the legitimacy of women's rights and the rights of their households for clean and modern energy services both for social reproduction and production purposes (Fraser, 2009; Caventa and McGee, 2010).

3.1.5 Political Economy Analysis

Political economy is an analysis that combines the identification of *structures* of economic action, but makes their outcomes somewhat *indeterminate*, meaning that more than one outcome is possible; and therefore the actual outcome would be influenced by the exercise of power through *politics* or, in other words, the acquisition and use of *agency* by various actors.

The noted failures of mere supply-side or technocratic policies, have led to a search for analytical systems that would enable a more robust policy approach to covering the urban-rural gap in energy use and reducing women's labour burden and the negative health effects of fuelwood use. This led to a departure from the prevailing Washington Consensus doctrine, which emphasized the necessity of allowing the market forces of demand and supply to determine transactions. Governments were expected to intervene only with market failure, as in providing public goods, such as law and order and infrastructure, where externalities would result in market failure.

But even within Washington Consensus-based organizations, there seems to have been some recognition of the limitations of a simple demand and supply analysis in the context of projects that are meant to achieve objectives such as reducing poverty, gender inequality and other social inequalities. The approach of government or programme intervention in a number of political arenas was adopted despite the stated principle of not being political. As a group of World Bank staff put it, it is necessary to understand "...the political economy context of reforms from a diagnostic perspective, in order to be able to assist countries in designing and implementing development strategies and policies" (Fritz, et al., 2009: 1, fn 1). This has led to attention to political economy both by bilateral (DFID, 2009) and multilateral organizations (World Bank, 2008; OECD, 2014) adopting it for some types of project-related analysis (Levy, 2011).

Political economy analysis, however, has a long history going back to Adam Smith, David Ricardo, John Stuart Mill and Karl Marx. It is usually understood that political economy has a Marxist lineage, but it is forgotten that classical economics was an explicitly political economy analysis, with Smith, Ricardo and Mill putting it in the titles of their major works. These works of classical political economy laid out the structures of production and ownership of property that determined the functioning of economies. Along with this classical orientation, political economy, largely with a Marxist bent, also developed as a critical theory setting out the major changes in economic and political structures that were necessary for substantial changes (Ford, 2003). But, being linked with the design and implementation of policies and programmes, the “new political economy analysis”, as it has come to be called, is explicitly problem-oriented, aimed at solving problems in formulating and implementing policy, as against the critical theory (Barnett, 2014). This new political economy has gone through a number of types of elaboration. Even though there may be some loose “phases” or “generations” of this new political economy (Hudson and Leftwich, 2014), it may be preferable to label these as types rather than phases.

One concept introduced into the structural analysis was that of *governance*, which was introduced as a factor affecting the implementation of otherwise good policies. Non-implementation was usually attributed to that catch-all phrase “lack of political will” or of vested interests (Unsworth, 2001, quoted in Barnett, 2014: 1). Governance, however, seemed to be something that could be dealt with to improve project implementation but the analysis was largely of a technical, administrative or capacity building approach (Hudson and Leftwich, 2014).

More important in modifying the structural analysis was the introduction of institutions, from the institutional analysis perspective developed from the work of North (1990). Incentives and transaction costs and the *rules of the game*, rules that govern functioning, are factors that work within and through economic and political actions. This could be narrowed down to getting incentives right, but could also be broadened to include dealing with the ways in which institutions could be changed and modified. This is important because they influence many aspects of gendered and other social functioning of informal *norms*. Norms get established over time and as the analysis of Roland, 2004; Sen, 2010, Nathan and Jahan, 2013; Kelkar, 2014 points out, they are slow-moving institutions compared to relatively fast-moving institutions such as policies and laws.

Governance and institutions modify the working of economic structures. They also extend the notions of power to more than the ownership of resources and political power, including social, and gender relations. But despite making the political economy analysis more complex, the analysis does not itself contain any notion of the possibility of how these structures can be changed on a large scale or modified on a small scale. For this it is necessary to add politics into the mix of economic and institutional analysis, as stressed by Hudson and Leftwich (2014).

Thus, it is necessary to bring into the analysis both power and the ability of those with less power (the poor or marginalized, such as women) to have agency or influence the functioning of economic and political structures. Also, it is necessary to have an analysis that has a measure of indeterminacy or contingency in the outcomes. What indeterminacy means is that the economic structure of ownership and power does not entirely determine the economic outcomes for all those involved. For instance, wages in garment supplier firms in developing countries such as Bangladesh have increased because of the associational power of women workers; this is an increase that would not be predicted by a mere structural analysis of power in global value chains (Nathan, Tewari and Sarkar, forthcoming).

This indeterminacy or contingency of outcomes provides space for projects to intervene in changing outcomes from those that a simple structural analysis of power, the state and market would predict. Bargaining between state, employers and social actors, including groups, conducted through both formal and informal routes, then becomes a subject of analysis of political economy (IDS, 2010). Indeterminacy should not be taken to mean voluntarism or that anything is possible. One of the tasks of a political economy analysis is to identify the extent of indeterminacy and, therefore, what political intervention or reform can accomplish. Further, what is needed is to show how the distribution of power and the indeterminacy of outcomes, even if limited, can be utilized by different sections of society. Agency is related to power; but agency itself is the ability to create space for power and its use in influencing development outcomes. Agency comes into play in modifying outcomes from those of structures, including those of ownership of resources and institutions that guide their functioning.

Booth dismisses the idea of 'agency' as "an academic affectation that does not help development practice" (Booth, 2014). This criticism ignores the levels of agency involved in various decisions and the constraints to their implementation. The decision to eat may be the simplest one, but even that is constrained for many women in India and Nepal by the norm that they eat only after the men and male children of the household have eaten. Here by agency we are referring women's ability to make and implement economic decisions about agriculture, enterprises and fuel use.

Though Hudson and Leftwich (2014) argue that politics is quite additional to political economy, there is a tradition in political economy that opposes the determinacy of structuralism and brings politics and agency into political economy itself. In this approach, political economy is defined in a reflexive manner, where agents (or actors as the new political economy represents them) not only respond to structures but also, in turn, through their agential action modify these structures. The actions of trade unions as countervailing power to employers in the sphere of labour come to mind as agential power that can, at least partially, modify the outcomes of wages and working conditions, also supporting the hypothesis that women's groups can have agential power. In a study of the Indian Himalayas, the SHGs are reported to have been successful in reaching poor women, particularly in building their financial skills and economic agency for small scale group-based income generation (Kooijman-van Dijk, 2008).

Thus an analysis of political economy is that of the interaction of political and economic processes in a society, such as the distribution of power and wealth between different groups and individuals and, the processes of contestation and bargaining between interest groups with competing claims over rights and resources. It is also interested in how these processes tend to create, sustain and transform these relationships of power and wealth over time (Collinson, 2003; OECD, 2011; DFID, 2009; Barnett, 2014).

Power, however, is related not only to wealth but also to position. Wealth is easily accepted as an indicator of power, particularly in a market-based economy. But position, such as that of the politico-bureaucratic elite, and of the male gender, is also a source of power, one that can be used to design policy to favour one or another social group, while also securing some benefits for its own self. In a democracy, there is also the power of the voter, not so much as individuals but as a group. The democratic political process, however, also provides a solution to the nature of the process of policy reform. As an analysis of the political economy of energy reform in India points out, politicians speak simultaneously to two groups – the political and financial elite, who wield influence "mainly through access and money" and the political constituency of rural women and men, who wield influence "through the vote" (Lal, 2006, 19). Sometimes the contradictory power of these two groups can lead

to pulls that result in a “rhetoric-implementation gap” and result in what Lal calls “stealthy gradualism” in energy policy reform (2006: 1, 22).

However, there are other groups that can influence policy, and theirs is an influence that does not make itself felt through the electoral route. These are organized groups of citizens, whether workers in trade unions or women in women’s groups. Such groups can influence policy not only through their collective votes, but also through their mobilization in civil society actions, even if these actions are reactive rather than proactive. The widespread mass protests following the December 2012 rape-murder in Delhi and the legislative and administrative measures that followed is an example of how civil society can influence policy. Consequently, in our political economy analysis of energy we bring in the possible role of civil society, such as women’s organizations, in influencing both policy and its outcomes. At both policy and analytical levels this is a departure from standard political economy analysis.

3.1.6 Gender Analysis

Gender analysis is a well-established stream of social science; but some of its main features are summarized here as a transition to the main discussion of gendering political economy. If political economy deals with overall structures of the economy and society, gender analysis unpacks these structures to reveal their gendered nature, i.e., that women and men are unequally integrated into these structures and that the distribution of benefits from these structures is also unequal.

The standard questions of gender analysis, such as, who does what, who gets how much, or who has access to ownership and control of resources – these are all aspects of gender analysis that are part of the institutional structure of an economy, its formal rules and informal norms. Gender analysis has very substantially dealt with formal rules and informal norms that affect the actions of women and men (Kelkar and Nathan, 2007, Clancy and Kelkar, 2006, Cecelski and Dutta, 2011, Clancy et al., 2011). Formal laws of ownership of land often discriminate against women. A lot of discrimination is informal, due to norms that are socially and culturally constructed; this is something that gender analysis has in common with political economy. The discrimination against the girl child, whether in the provision of medical care or access to education is an example of pervasive gendered discrimination in many Asian societies. Consequently, one may say that the revival of political economy, through bringing in institutional economics, meaning the role of both formal and informal rules and norms, is part of gender analysis.

Gender analysis has gone beyond dealing with structures to analyze the possible agential roles of women in changing or transforming gender relations. From seeing women merely as victims of unequal structures there has been an emphasis on identifying ways in which these structures could be modified, even if not altogether changed (TERI and UK Aid, 2015). Gender analysis makes a distinction, due initially to Caroline Moser (1989), between the practical and strategic needs of women, where the former are women’s needs for food, education, etc., and the latter are factors that enable women to change their existing gendered positions – strategic needs would enable women to contest existing gender relations. Women’s entry into the paid labour force, for instance, has been identified as a factor that made gender relations into an area of contestation (Castells, 1997). Thus, the manner in which women’s agency can be crucial in negotiating and modifying structures, which is a feature of new political economy analysis, is very much there in gender analysis too.

In what follows, we go through some of the main features of the manner in which gender has been or can be integrated into political economy analysis, noting that both have substantial common

ground in emphasizing that power leading to agency can be used to modify the workings of political economic structures. The indeterminacy of outcomes can be shaped to improve women's position, whether in the use of energy or in other spheres. Recent political economy analysis, particularly in the energy sector, has overlooked gender as a lens that could provide analytical insight and an area for coalition building.

3.1.7 Bringing Gender into Political Economy Analysis

There is a gendered form of power that is not captured in the conventional analysis of political economy. Power in gender relations wielded by men is due to a number of factors. The first is men's ownership of productive assets, including land. Second is their control over income and the ways in which it is utilized. Third are the social and cultural norms that dictate women's responsibility for household domestic work, or the tasks of social reproduction, which, at a higher level, is manifested in the exclusion of social reproduction from the domain of recognized work for macro policy formulation. Further, unlike in the global North where social reproduction is generally seen as unpaid household upkeep and care work, the conceptual analysis of social reproduction in the global South also includes a great deal of activities carried out in the production sphere, i.e., subsistence production of goods, work on the family farms, collection of goods such as water, fuelwood, fodder, raw materials for craft, and fruits and vegetables (Hirway, 2015).

Counter-posed to this structure is women's agential power, or countervailing power, one that, if brought about, can enable women to bring about some changes in outcomes, including energy outcomes. In drawing from the political economy literature, we use the term **agency or agential power as the power to make decisions and act upon them, or what is otherwise called empowerment** in the gender analysis literature. Agency is sometimes held to require both resources and processes to be empowering (Sen, 1999). But rather than seeing agency as just one of many dimensions of empowerment, we see it as synonymous with empowerment. Agency itself can be used to acquire resources, such as land and financial assets, which in turn can enable women to make decisions about investment and production and the use of income. Again, agency will necessarily have to be manifested through certain processes of decision-making. In the absence of agency there may be a process of decision making that is automatic (as is elaborated below) and infused with existing social norms marginalizing women and their strategic needs. In the course of exercising agency women will necessarily have to change these processes. Resources and processes are then aspects of social relations through which agency operates, rather than aspects of agency.

While new political economy has neglected gender analysis, except for a mention of its necessity in Barnett (2014), there is a long tradition in feminist political economy of the integration of gender in political economy analysis. This tradition goes right back to the 1990s with the writings of Elson (1995), Jackson and Pearson (1998) and the DAWN group (1985), with an initial focus on critiques of the gender dimensions of structural adjustment programs. But it would also be right to say that these analyses were more concerned with critical theory than with problem solving. At the same time, gender analysis also has a long-standing concern with understanding agency, including its influence on household bargaining outcomes (Sen, 1999; Nussbaum, 2000).

Thus, critiques of gender-exclusive political economy have developed into a feminist political economy (Bedford and Rai, 2010; Rai and Waylen, 2014) which "reveals and clarifies how gender determines or influences the social and political relationships and structures of power and the differential economic effects that flow from these relationships and structures" (Interpares, 2004). This gendering of political economy combines "both the structural and agential elements of social

relations” (Bedford and Rai, 2010: 4). This combination of structural and agential elements should allow for its application to problem-solving.

3.1.8 Levels of Analysis: Macro, Meso and Micro

What follows is an attempt to identify and integrate the macro, meso and micro analyses of energy policy formulation and implementation, and the final use of energy at the household and individual levels (Energia, 2015). Gender norms, rules and institutions operate at all three levels and it is necessary to identify both the manner in which they operate and the manner in which their operation can be modified. Therefore, norms form a key element of any policy related political economy and the identification of drivers for change.

The macro level of analysis looks at the economy as a whole, in terms of policy and aggregates of output, demand, and supply. Gender critiques of macro analysis began with the gendered consequence of structural adjustment programmes in the early 1990s. At a conceptual level, this has been extended to additional issues at the macro level, such as the gross under-representation of women’s work in the manner of calculating GDP (Waring, 1989) and the neglect, rather, taken-for-granted gendered non-monetized domain of social reproduction in macro-economic analysis (Elson, 1994). We look at how this non-monetized domain of social reproduction is reflected in the rural-urban energy gap in India and Nepal. As is emphasized in the recent *World Development Report* (World Bank, 2015), our ways of thinking about the world, or our mental models, profoundly impact what we do. The invisibility of women’s work in social reproduction, including that of cooking, means that it does not enter into macro- and meso-level policy discourse. It is as if what is not counted in the system of national accounts (SNA) does not exist and thus does not get policy attention. What is seen as the gender bias of policy and decision-makers is related to the standard and well-accepted mental model of the world in which women’s work in social reproduction does not exist as a valid category in national income accounts.

The reasons behind the gap in urban-rural energy use noted above are both structural and policy related. Where the electricity sector is trying to increase its financial viability, more attention is paid to areas that are more profitable. Remote rural areas have poor road connectivity, and thus a higher cost of establishing and operating grid connections, and low density of users with dispersed populations. As a result there are higher costs and lower returns. Governmental concern with financial viability of the electricity sector, even more so in order to reduce fiscal deficits, makes remote rural areas a lower priority in extending the national grid. With regard to LPG, where distribution is largely privatized, the same factors of low density of users and higher transport costs reduces the incentive to establish commercial networks of LPG distribution.

Besides these structural factors, there is an important policy difference that accounts for the much larger deficit in modern cooking fuel than in the case of electricity. Electricity access is understood as being important for growth and development. Consequently, developing country governments have targets for electricity access. Access to modern cooking fuel, on the other hand, is neglected in energy policy, despite WHO campaigns and abundant literature from various authors on the negative effects of burning wood for cooking. In a sense, **the invisibility of women’s work in cooking is translated into its neglect at the policy level** (Maria Robinson Foundation, 2012; Gill et. al., 2012).

Overall, very few developing country governments have targets for access to LPG or other modern cooking fuels. Both India and Nepal do not have targets for access to modern cooking fuels (UNDP and WHO, 2009). In the case of Nepal, a gender-targeted approach with subsidies for women has been adopted within the renewable energy sector since 2012 (NRREP, 2012). There are also targets

for the reduction of use of fuelwood through substitution by biogas or improved cook stoves. In response to international pressure to do something about climate change, it is only very recently that the Government of India has begun to recognize the health problems related to women's use of solid fuels, mainly fuel wood, for cooking. At best, earlier policies have been about providing improved cookstoves, not affecting a transition to modern, efficient and clean fuel, such as LPG.

The disconnect between the spread of access to electricity and the uses of electricity or some other modern fuel in cooking is marked even in countries with relatively high levels of electrification and policies to promote access to modern fuels. In Sri Lanka about 94% of the population was covered by the national grid in 2012, but biomass continued to be the most widely used energy source for cooking (Energia, 2015). South Africa, besides connecting more of the population to the grid, also has a policy of Free Basic Alternate Energy (FBAE), announced in 2007, which is expected to provide non-grid, but alternate energy to those not connected to the grid. Despite this, cooking in rural areas continues to rely on wood as the main energy source (Matsika et al., 2013). In 2007, wood use was at 30% for all of South Africa and it was as high as 50% for households in the Eastern Cape (Matinga, 2010). Analysis of South Africa also supported the hypothesis that remoteness was connected with poor outcomes in the use of modern fuel. Poverty certainly played a role but it is clear that "the geographical location has influenced policy implementation" (Mohlakoana, 2014: 332).

There is an intriguing difference between these experiences and that of Bhutan. In the early 21st century, firewood accounted for 90% of household energy consumption in Bhutan. But electricity now "tends to be the primary energy source for cooking once households get electrified" (Energia, 2015a: 9). This is at variance with the other experiences where, despite the spread of electricity, households often did not switch their cooking fuel. It is certainly worth exploring why Bhutan's experience has been different. The political commitment to clean home environments with controlled carbon emissions throughout the country, including remote areas, and the continuing influence of the matrilineal system on social norms (though diminished over decades of Hindu patriarchal influence from neighbouring India and Nepal) might be some of the reasons behind Bhutan's success in switching over to clean energy for cooking.

Overall, however, in securing women's access to modern energy services (electricity and LPG) in remote areas, the structural problems of remoteness and the policy neglect of a major part of women's work, their social reproductive work, have to be **negotiated**. For that, at the policy level, a paradigm shift is needed to pay attention to women's (and children's) health needs by bringing modern cooking energy supply at par with the provision of electricity (Rehman et al., 2012).

What agential action can be undertaken at the macro level? There are two aspects to this issue. The first is analysing ways of thinking about the world. Second is that of building a political constituency in favour of action in engendering energy policy, which is formulated and implemented at macro and meso levels. This political constituency for engendering fuel policy can come about at various levels, macro and meso. A national political constituency in favour of gender sensitive energy policy may be difficult to bring about, but experience has shown that local coalitions, such as women's groups based on women's strategic interests, can bring about some change at local levels, as seen in the role of SHGs in Andhra Pradesh (Dev, et al., 2012) and Improved Cook Stoves in Nepal (AEP, 2011).

But a political lobby in favour of action on women's energy issues could be built by pointing to the seriously negative health implications of indoor air pollution resulting from the use of wood as cooking fuel. Many reports of the World Health Organization (WHO) and papers in *Lancet* bring out the high incidence of chronic respiratory ailments due to wood smoke pollution, and more than half of the premature mortality (0.32 million) in India due to residential energy used for cooking and

heating (Lelieveld et. al., 2015). In addition there is the environmental benefit of reducing carbon emissions involved in the burning of wood as fuel.

Stressing these analyses and figures could possibly make an impact both on policy makers and on public opinion, leading to a change from policy neglect to active intervention. It should be pointed out that the issue of open defecation, which is widespread in both India and Nepal, has recently received substantial policy attention, with campaigns launched to improve sanitation. The whole policy process was sparked off by this year's Nobel Prize winner in economics, Angus Deaton's analysis (2013) of the earlier neglected issue of the development impacts of sanitation, and specifically on the stunting of children (Coffey et al., 2013). The same could be done with regard to the use of fuel wood and the consequent household air pollution. This is where focused campaigning by women's organizations and other civil society groups and individual experts could make a difference to macro-level policy on ensuring clean cooking fuel, like the attention that is now being paid to ensuring electricity access and, on a lesser scale, sanitation. The question of women's access to clean cooking fuels could possibly become an election issue in rural constituencies.

The meso level of analysis is not much investigated, certainly not from a gender angle. This is the domain of particular markets (such as for fuel), governance systems, administrative structures. The meso level also includes networks and norms, gendered norms that influence the work of meso-level actors of the state, market and society (Elson, 1994). Micro-level behaviour is also affected by norms generated or regenerated at the meso level. Consequently, micro-level energy use is not just a matter of individualized decision-making, but is in fact a result of the interaction between norms that come into existence and change at various levels of society and characteristics of individuals within households. Norms that affect behaviour are created at the community, group or network levels. These gender norms, in turn, affect behaviour at the micro level. They also affect policy making at the macro level.

From a political economy perspective, what is important is to identify factors that influence or change actual workings of energy policy and enhance the agency of women in energy use decisions. For this purpose it would be useful to concentrate our analysis on the roles of organizations of women (and men too) and gendered norms in energy practice. Issues at the micro level and the dynamics of fuel and technology choice at the household level are dealt with in section 3.1.11 below.

3.1.9 State and Market

We will first look at the role of state and market at the meso level, and then go on to those of social networks and social norms. At the meso level, there can appear the well-known "implementation gaps" between what is promised in policy at the national level and what is delivered in practice. But there is a link between the two levels, the macro and meso, and the gaps between policy and practice.

For instance, in India there is a general policy of making LPG available at subsidized rates. But in the absence of commercial distribution networks in remote rural areas the subsidies benefit basically those in urban and peri-urban areas and the better off in rural areas. The latter can bear the higher costs of transport associated with poor distribution networks. Therefore, the gap between the promise of subsidized LPG and the reality of its non-availability is not created at the meso level, but is manifested there because of the macro-level policies of LPG distribution through commercial networks.

The failure to build LPG distribution networks in rural areas, remote and not-so-remote, should be contrasted with the much more successful attempts to extend the electrical grid to such areas. The

reason for this difference, one can surmise, is due to the fact that for electricity grid expansion targets are set for remote, rural areas to be reached, while there are no such targets for LPG network expansion. The macro-level failure to recognize the importance of clean cooking fuel is translated into a total neglect of state and district-level initiatives on cooking fuel. Similar cases were observed in Nepal where despite the enabling financial support provided through the National Rural and Renewable Energy Programme, adoption was low. The high cost due to lack of transport and service providers restricted the availability and supply of these technologies.

Without macro-level targets being set, there is limited intervention in any sphere. In addition, under the current regime in India, there have been cutbacks in 'social sector' programmes, according to information from budgets and discussions with officials, which had been instituted by the earlier government. What, for instance, could have been spent on increasing well-being of indigenous people households had been reduced, since there was an increased emphasis on investment that would directly contribute to growth. This meant that central and state money was being directed to potential high growth areas, such as the plains and coastal belt of Odisha; while the remote areas with poorer growth prospects were being neglected.

Interestingly our discussions with the local managements of large corporations in Koraput, led to the same results – we were told that something could be taken up at the local or plant level, only if this was mandated by Corporate Social Responsibility (CSR) policy from corporate headquarters. The 2% of net profits that is now legally required to be spent on community welfare through CSR schemes is largely being utilized for infrastructure schemes around the state capital and in the high-growth coastal belt, as per the information provided by corporate officials. CSR is a new initiative in Nepal and is yet to be looked into.

3.1.10 Women's Social Networks and Gendered Norms

State organizations and markets are networks that link different types of actors. In the case of state organizations they link those who provide and those who access various types of energy services. Markets again link energy suppliers and users through the nexus of buyers and sellers. But in the functioning of these organizations of state and markets, other types of networks also enter the picture. These are the networks of what might be called interest groups. Trade unions are well established as one example of this type of interest group. Over time, women's groups have also entered the picture as interest groups. Women's groups can take many forms; the forms that we are concerned with are those of the so-called SHGs in India or SCGs in Nepal.

Women's groups enter the picture in between suppliers and users, or between sellers and buyers. Acting as groups, rather than atomized individuals, women's groups are able to somewhat influence both state and market relations. For instance, in the usual market-centered credit system, loans are given against collateral. Women, poor women in particular, do not own land or other property that can be used as collateral. But, women's groups, whether as SHGs or SCGs, are able to offer a group-based assurance of repayment, which acts as a form of non-asset based loan guarantee. Women's groups are able to modify the functioning of market and state organizations and even change their rules of access.

Despite the fact that women are found to be quality clients of financing institutions, as they are considered sincere, take only necessary amount of credit, use it in the proposed project, operate the project in an efficient manner and repay the principal and interest on time (Shrestha, 2010), one still finds reluctance amongst financing institutions where the provision of loans for women-owned enterprises is concerned.

Decisions about energy use are governed by certain rules of behaviour that create roles. These rules can be called norms, which take the force of social rules. For instance, the norm that men are the chief decision-makers in matters requiring the expenditure of money is a gendered social norm, one that creates roles for men as decision-makers, and women, as decision-implementers in, say, using traditional stoves. Norms are social rules and they can play a role in actions quite irrespective of laws. There are, for instance, legal rules about women's inheritance of property in India in the Hindu Succession Act as amended in 2005. But the social norm that women do not inherit ancestral property still continues to hold sway.

However, there is a two-way relation between norms and decision-making. On the one hand, norms lead to a certain way of taking decisions automatically, without thinking as it were. On the other hand, norms also change, or are changed, over time and, perhaps, informally by changed practices. For instance, as mentioned earlier, the changed practice of women's groups leading to women accessing loan finance has itself, over time, changed the norm about women's role in decision-making over household land and fish ponds in Bangladesh (Kelkar, Nathan and Jahan, 2004, for finance; and Nathan and Jeean, 2013, for ponds). Norms then are a meso-level institution influencing the manner of household and community, and even macro, decision-making about energy access and use.

3.1.11 Micro-level Analysis: Women's Energy Use

As noted above, the third level of analysis is that of decision-making at the **micro level**, understood to be that of the individual economic agent, woman, man or household, even the farm or enterprise. Economic analysis has been built on the basis of the 'economic man' (Ferber and Nelson, 1993), driven by the maximization of income or utility; but more recent developments in behavioural economics have led to a more realistic account of the nature of decision-making (World Bank, 2015).

Decision making is now seen to be divided into two types – automatic and deliberative. Most often one carries out automatic, rather than deliberative, decision making. In automatic thinking, custom and social norms lead to a narrow framing (or boundary setting) of decision making, with decisions most often falling back on the default option. The default option, dictated by custom and social norms, is similar to Bourdieu's concept of *doxa* (1978), where it means that the attitudes are taken for granted, the norms and customs are handed down and taken as the way of seeing persons. Behavioural economics is now bringing this *doxa* or default option into the analysis of economic decision making. These default options, of course, are gendered, even when women themselves follow them in taking decisions. As an example, rural and indigenous women in our study areas see the use of wood for cooking as the default option, one dictated by custom. Even the accepted social norm that, if time is available, then fuel should be collected and not purchased is a default option that can be seen to be dictated by custom. Custom can be expressed in different ways, not just "we grew up with it", as in the title of Margaret Matinga's thesis on energy acquisition in South Africa (2010). Custom is also a way of meaningful production of identities, such as "being Xhosa, being a 'good woman'" (Matinga, 2010: 203). Similarly, studies in Nepal (Biogas Users' Survey conducted annually) also indicate that the use of fuelwood is in no way remarkably reduced despite ICS interventions due to cultural and preferred cooking habits.

There is a gendered framing of decision options, formed, as mentioned above, by existing norms that result in thinking with gendered default options. But the gendered framing of decisions is also, in part, based on the accessibility of various types of information; which also introduces a role for deliberate information interventions. For instance, discussions with women in two study areas showed that they did not make any connection between smoke from burning wood and acute

respiratory illness (ARI), though there is very substantial medical evidence of the effects of indoor air pollution due to cooking with fuel wood (Balakrishnan et al. 2014; Shakya, 2009; CRT, 2014; Matinga, 2010, on South Africa).

Making information available about the negative health effects of fuel wood could help change the framing of decision making about fuel use. But, while necessary one cannot assume that such information will be sufficient to change social norms about fuelwood use. Possibly changes in the economic status of women would also be needed.

Individual and household decision making, however, is not only about possibilities and default options, it is also about aspirations (Appadurai, 2004; Nathan 2005). Indigenous women, for instance often express the aspiration that their daughters should not be illiterate as they are. In the analysis of fuel use for cooking, Balakrishnan et al. (2014:143) state that “gas or electricity probably represent a ‘near universal aspirational standard’ for households”. As seen in recent examples in India, women’s work in agriculture has led to women farmers’ aspirations to be the owners of land (Kelkar, 2015; MAKAAM 2014/15). The spread of television and the mobile phone to even remote households has certainly spread these aspirations. Thus, one should list both accessibility of information and aspirations as factors that could change women’s decisions about fuel use, and not only economic factors such as demand for women’s labour in various types of work.

The framing of micro-economic or household decisions about energy use is not just a matter of norms; rather the norms themselves may be shorthand for the exercise of power within the household. The norm that men take decisions about fuel use could be due to men’s stronger bargaining position in household economic decisions. Even mainstream economics has largely abandoned the notion of a unitary household, with decision-making undertaken by a benevolent male head with the interests of all members in mind. That the household is a collective decision-making unit with members that undertake cooperation in producing household income, but also conflict over the distribution of its benefits (Sen, 1990) is now a standard part of gender analysis of household behaviour.

The cooperative-conflict model predicts that an increase in a woman’s income earning or her asset ownership will increase her bargaining power within the household. Even with higher household income, without an increase in woman’s own income, is there a tendency for women’s cooking fuel needs or desires to be neglected? Data from household surveys show that despite an increase in rural household income, there is not much change in fuel use patterns (Kelkar and Nathan, 1997). In addition, anecdotal evidence from our field investigations in Odisha and Kailali shows that women complain about men’s neglect of their desire to switch to cleaner fuels.

In women-headed households, there are no gendered power barriers on decisions about fuel. Do they show a different pattern of fuel use? Indian household survey data show that women-headed households have a higher incidence of clean fuel use (basically LPG) than men-headed households (Dalberg Global Development Advisors, 2015). Thus, women’s agency in household decision making would seem to make some difference in fuel use.

Agential action within existing structures, however, can affect constraints only to an extent; long-standing or sustainable change also requires a change in the structures themselves. At the same time, such agential action can have the effect of nibbling away at norms, gendered norms that support and preserve gendered behaviour. Gendering of political economy not only deals with constraints but also seeks ways to increase degrees of bargaining that could, over time, remake the constraints. Women’s energy needs and aspirations are different from those of men, hence a gender

analysis of political and economic processes is key to a change in power relations that can bring women access to clean energy for production and social reproduction.

3.1.12 Dynamics of Change in Energy Use

We noted in the previous section a number of factors that relate to women's use of modern energy. In this section we systematize them and hypothesize about the "drivers of change". Some drivers of change in women's energy use are:

- the increased value of women's time brought about by out-migration of men, and women's increased participation in production and commercial activities, brought about by infrastructural connectedness; and engineered by women's groups
- technological change in the shape of cheap diesel engines, promoting mechanization of agriculture
- new concerns about women's and children's health due to household air pollution
- national responses to international concerns about climate change and a clean environment
- technological change in information and communication technologies (ICTs) leading to awareness of the wider world from radio and television
- low cost and efficient appliances for lighting and the subsequent necessity to have access to very small amounts of electricity
- increased literacy of women and girls
- concern for human rights of indigenous peoples.

The above factors could be a dynamic within which political action by women could be the initiator of change in fuel use.

Women's fuel use is for both social reproduction and production tasks. Together social reproduction and production tasks create pressure on women's time. This pressure on women's time leads to the adoption of labour-saving techniques, including the use of labour-saving techniques in social reproduction work, particularly that of cooking. Labour-saving techniques in cooking could begin with substituting purchased for collected wood for fuel, use of kerosene and go on to the adoption of techniques that are more efficient, such as the use of LPG.

We saw that a change in social reproduction fuel use to LPG, initiated through a subsidy, is unlikely to be sustained beyond the period of the subsidy. On the other hand, a change in demand for women's time for production is likely to lead a change in fuel use for social reproduction. In this manner, it is the sphere of production that is dynamic, leading to or initiating pressure for change in fuel use in the social reproductive sphere. **The politics in gendering of the political economy of changing fuel use is in women's increased participation in production activities, often mediated by women's organizations. This has its attendant effects on women's greater control over income and assets, which, in turn, advances women's agency in their choice of energy use.**

There is the interlinked factor of household income with women's control over it. Earlier analysis of Indian household consumption data showed that an increase in household income did not lead to a proportionate decrease in the use of fuelwood (Kelkar and Nathan, 2005). A similar continuing high use of fuelwood has been shown in studies of Nepal. Our field analysis will test the relative importance of women's agential power over the use of household income in creating pressure for change in energy use.

As noted above, we identified three levels of analysis of the political economy of women's fuel use, macro, meso and micro. At the **macro level**, changing policies requires a paradigm shift in

recognizing all of women's work, including that in social reproduction, as part of social work. This paradigm shift is not something that could easily be brought about. What could help in bringing more attention to this is policy advocacy on the issue of the adverse health and environmental effects of fuelwood use.

At the **meso level** we have seen that women's groups, such as SHGs and SCGs, could play a role in enabling women to take up production activities that would, in turn, increase the pressure on their time to be more efficient in social reproductive work. Along with this, the spread of market-based activities, also increases scope for women's labour in production; this results in a push to increase labour-saving fuel, such as moving from collecting to purchasing wood and then to using LPG or electricity.

At the **micro level**, women's increased involvement in production activities could strengthen women's bargaining power. To the extent that this involvement in production is not as 'unpaid family labour' but as independent income earners, there would be an improvement in women's fall-back and thus bargaining position. This could also lead to an increased perception of women's individualized contribution. Most importantly, this changed practice could also lead, over time, to changes in norms about the roles of women, accepting their position as independent income earners.

Our analysis linked changes in energy use for social reproduction to changes in the demands for women's labour time in production. This leads us to put forward the hypothesis that the dynamic element driving changes in household fuel use is women's involvement in the production sector. This possible dynamic is corroborated by the reported statement of Chinese women that "...the expenditure on the purchase of items which reduced reproductive toil would always come second to productive, income generating expenditure" (Lucas et al., 2003).

In the analysis of the connections between women's agency and fuel use, we also look at the question: does women's access to modern energy, through project-based subsidies, such as observed in many interventions in India and Nepal, lead to an increase in women's agency? This can be done by comparing the connection between fuel access and agency in project and non-project areas. It is expected that the analysis of these experiences will strengthen the policy suggestions following from this research.

In this study we have put forward a framework for the analysis of the demands on and valuation of women's labour in relation to changes in fuel use in rural areas, to be used in comparing more remote and less remote rural areas of India and Nepal. In analyzing this issue we utilize a gender inclusive political economy framework, in contrast to the prevailing technocratic or household income solutions. We have identified women's participation in production, which increases the opportunity cost of their labour, as the crucial gender factor in promoting a fuel transition; and the importance of women's organized groups in changing power relations and enabling and promoting women's participation in production.

A four-pillar strategy for gender transformational change is likely to redress women's gendered exclusion from modern energy, an exclusion that is particularly acute in remote rural areas, and promote gender equality: (1) changes in macro policies that recognize women's work of all types and in norms and practices at local levels; (2) social mobilization as a form of meso-level power intervention to realize women's access to production activities; (3) women's micro-level equal access to ownership and management of productive assets; and (4) gender sensitive concerns and sharing, by both women and men, of roles and responsibilities in social reproduction. This study concentrates

on the first two aspects of the transformative change, but the last is also necessary for a rounded equality that can promote energy policy.

Despite the breadth of advocacy on a wide range of women's issues during the past twenty years, the policy responses have tended to focus on some specific issues, such as gender budgets and violence against women. Women's strategic need for clean, modern energy and their rights to productive assets have failed to gain serious policy attention, with the exception of recent pronouncements for subsidized LPG and improved cook stoves in rural areas. It is still unclear how these policies will be translated into action, as many of them are hugely contentious, challenging day-to-day practices and norms.

A major concern in this study is to understand the gender factor that would promote women's access to clean energy in remote and less remote rural areas. Women's energy access, when provided along with or following increased income earning opportunities, could, in turn, change community and household power relations in favour of women and lead to the normatively required fuel transition.

3.2 Other evidence and developments

The research team made two visits each to proposed field sites, Koraput District of Odisha, India, and Kailali District of Nepal. In Koraput we interacted with women SHGs, individual women vegetable farmers, women running small enterprises, private sector managers (engaged in cashew processing and a paper mill) and district-level government officials. We visited sites of an ICS project, biogas plants and a gassifier plant. In Kailali we conducted focus group discussions with women farmers, women small enterprise managers, vegetable shop keepers, energy users' cooperative officials, bank managers, district and local government officials, and Community Rural Electric Entity officials. Subsequently, in the state capital of Odisha we met state government officials in the Department of Panchayat Raj, the Odisha Renewable Energy Development Agency and the Odisha Rural Development and Marketing Society. In Kathmandu, we interviewed women and men drivers of 'Safa tempos' (clean energy tempos), the officials of the National Electricity Authority of Nepal and Alternate Energy Promotion Centre of the Government of Nepal.

Our discussions with some senior officials and ministries and departments showed that women have a marginal presence as employees in the energy sector; where there are women, a significant majority is in non-technical fields. There were, however, others who maintained that the question of energy access is related not only to the technical aspects of energy system design for rural areas, but also a larger political economy question of energy, for example, which households in the village have access to electricity and who in the household uses it and for what purpose. In other words, they raised the question: How do gender roles and relations shape the supply and end use of energy? And conversely, how does the energy infrastructure shape gender roles and relations?

An analysis of our discussion with women SHGs in Odisha and women entrepreneurs in Nepal indicated the following: First, the need to see women's work beyond cooking and domestic care and as contributing significantly to agricultural production. This requires moving away from a generally shared worldview that the supply and end use of electricity, together with the market-based energy sources (such as diesel for irrigation and transport in agriculture) are considered a male domain in which women are seen as having only a marginal interest.

Second, the changing agential power of women is largely a result of male absence in the household due to migration of men. Women seemed to have acquired confidence and capability to manage both the household and farm on their own. Hence, a rethinking of energy access and the purpose of energy distribution would be needed. Both government and private sector suppliers of energy need

to ask: to what extent was/is energy supply geared towards gender inclusion and to increasing productivity?

Third, the broadcast media through advertising on television and radio, though largely gender-biased, have brought an increasing awareness about the world around in terms of changing gendered norms and women's defiance of oppressive existence, and their demand for toilets as one of the conditions in marriage and for the reduction of drudgery with commercially-operated grinding machines for grain, pulses and spices. In the peri-urban areas of Jeypore in Koraput and Ghoda-Ghodi in Kailali women were reported to have received technical training and were seen operating sewing machines for commercial stitching of garments, as a diversified livelihood activity.

The countrywide existence of SHGs or SCGs in rural areas of India and Nepal respectively is a major source for executing new ideas of clean energy for cooking as well as mechanical energy to draw water, till fields and transport crops. We noted such possibility with women's demand (68 applications) to drive battery-operated or LPG-based *safa* (clean energy) tempo taxis in Kailali, Nepal, and promotion of LPG in rural Odisha. The Odisha Rural Development and Marketing Society (ORMAS), an autonomous body launched under the aegis of the State Department of Panchayati Raj (village government) has initiated 'Shakti Gaon' (Power Village) programme in 4 districts of Odisha (Ganjam, Jagatsinghpur, Mayurbhanj and Sundargarh). With the help of women SHGs, ORMAS has been successful in introducing over 38,000 LPG connections. In the ORMAS outlets in the Block (Sub-district) level, women's groups are managing the sub-centre outlets and are involved in receiving and processing application for new connections, delivering cylinders, maintaining accounts, dealing with customers and creating awareness of the benefits of using clean energy for cooking. These SHG members are given technical training to repair the stoves, identifying and rectifying gas leaks, operating fire extinguishers, and keeping accounts.

Furthermore, the Government of Odisha, through its agency 'Odisha Renewable Energy Development Agency' (OREDA) has introduced solar pumping system in remote areas, where grid electricity-based irrigation was not feasible. OREDA has supplied 20,000 solar lanterns to artisans to enable them to do weaving and craft work in the dark.

To increase electricity consumption in rural areas, the National Electricity Authority of Nepal, with support from the Asian Development Bank, established a Community Rural Electrification Programme in 2009. The Programme initiated 249 Community Rural Electricity Entity (CREE) in 49 districts of Nepal. The CREE works through Energy Users Cooperatives for a population of over 2,000. The major function of the CREE is to encourage rural people to install electricity connections, raise the community share of the installation fund (10%, 90% from the Government of Nepal), and manage the distribution of electricity and tariff collection. The management committees of the Energy Users Cooperatives (EUCs) are encouraged to have women represented on the committees.

During the field visit to Kailali district in the far western region of Nepal, we met some members of the EUC Management Committee, which has a total of 21 members (14 men and 7 women). The women explained three uses of electricity: (1) agriculture – winnowing, threshing and operating pump sets in irrigation; (2) small businesses – tailoring, ironing, and running small vegetable and tea shops, and (3) lighting of houses, particularly for children's homework. None of them used electricity or LPG for domestic cooking though its use was observed for commercial purposes in small roadside eateries. They have continued to use fuelwood for domestic cooking, which they would collect 2 to 3 times a week from the forest or buy from the local market; this shows a strong indication that economic returns influence the choice of energy forms.

4 Proposal for Phase 2

4.1 Problem statement

Our key research question is: **How can women in rural areas be empowered to gain access to modern energy services in both production and social reproduction?** In answering this question we attempt to demonstrate that a gendering of political economy makes a difference to our understanding of women's agency in energy use.

In most emerging and developing countries, including India and Nepal, large numbers of women suffer from income and energy insecurity and poverty (Kelkar and Nathan, 2005; ENERGIA, 2015). The situation is much worse in remote areas, such as Koraput in Odisha, India, and Dhading (mountains) in Nepal; it is somewhat better in the better-connected Wayanad district in Kerala, India, and Kailali and Kavre (hills), Nepal; and much better in the well-connected Dindigul district in Tamil Nadu, India and Rupendehi in Nepal.

In developing economies there is a rural-urban gap in modern energy (electricity and LPG) access. This gap is greater for LPG than it is for electricity. In India in 2011 there was a rural-urban gap of 28 percentage points for electricity as the main source of household lighting – 94% of urban households and 66% of rural households used electricity as the main source of household lighting. But the gap in the case of modern cooking fuel use is much greater at 58 percentage points – 71% of urban households and only 13% of rural households used modern, non-solid fuel (mainly LPG but also including biogas) as the primary cooking fuel (NSS, 2011; Rehman et al., 2012). In Nepal, the electricity gap is 56.7 percentage points, with rural access being 34% as against 89.7% for urban access. The gap in modern cooking fuel use is not very different at 52.5 percentage points, with just 7.3% in rural areas as against 59.8% in urban areas (UNDP and WHO, 2009).

In this context of the poor access to modern energy (electricity and LPG) afforded to women in rural areas, particularly those in remote areas, **the overall research objective is to understand the factors that constrain or facilitate women's agency in the use of energy in the social reproduction and production spheres, leading to gender sensitivity in energy policies and women's empowerment in energy transitions.**

Remoteness here refers to the absence of all-weather connections to daily, urban and export markets, which go along with poverty and poor energy infrastructure and overall poor human development indicators. Our research sites in the two countries have been selected to represent gendered access to energy in a diversity of conditions of remoteness and economic development.

For India we have selected two remote districts, Koraput and Mayurbhanj districts of Odisha; while the moderately remote district is Wayanad district of Kerala. All three of them are in hill-forest locations, but connectivity in Koraput and Mayurbhanj is poor, while Wayanad is well-connected in the state of Kerala with the highest per capita consumption in India. In addition to cultivation of rice, Wayanad has a higher market-based development of coffee, tea and spice cultivation in small farms. Women are substantially involved in farming and processing activities of these crops through a large part of the year. With a high level of literacy and educational attainment, the state also has a network of people's science organizations and farmer facilitation technical centres (Kannan, 2015). Women, throughout the district and state are organized in women's groups under the state-supported *Kudumbshree* programme, also implementing a number of government programmes, such as the Mahatma Gandhi Rural Employment Guarantee Programme.

In order to provide additional contrast in women's time demand and fuel use, we will also study a well-connected village in Dindigul district of Tamil Nadu. This district has a high level of commercial development with high labour force participation of women. Electricity access is universal and LPG use is high. This will provide a useful contrast to women's fuel use in remote and less remote areas.

In Nepal, the remote region is Dhading district, which is poorly connected with the Kathmandu Valley. Moderately remote Kavre (hill areas) and Kailali district (Terai) have reasonable all-weather connections with main markets, but high transport costs. Kailali district is on the border with India and is well-connected with it economically. The contrast in Nepal will be provided by a village in the tourism circuit in Rupandehi district, which is well-connected with major markets.

The conventional analysis of poor energy access of women in rural areas, particularly remote areas, points to (1) the high costs involved in reaching remote areas; and (2) the low political importance, leading to low access to the realms of power, of both remote areas, and women therein in energy policy and practice. In addition there is a neglect of the use of energy by women in the sphere of social reproduction. While a transformation of cooking energy is important, **this project seeks to contribute to our knowledge of energy use by combining the analysis of the social reproduction (domestic cooking and care) and production spheres (agriculture, and enterprises) and their interactions in producing gender outcomes in energy use.**

Earlier observations (Kelkar and Nathan, 1997; Kelkar and Nathan, 2007) and current field observations show that where women are more involved in production or the conventionally defined labour force (including market-based and income-earning activities) there is a tendency for them to switch from collected to purchased and then to cleaner fuels, such as electricity or LPG. A study of sub-Saharan Africa pointed out: "Policies that target women's income-generating activities are likely to have greater impact [on energy use]" (Karekazi and Kithyoma, 2002: 1071). It has also been observed that in areas of poor income-earning opportunities, providing a capital subsidy may not lead to the sustained use of LPG beyond the project period (World Bank, 2002).

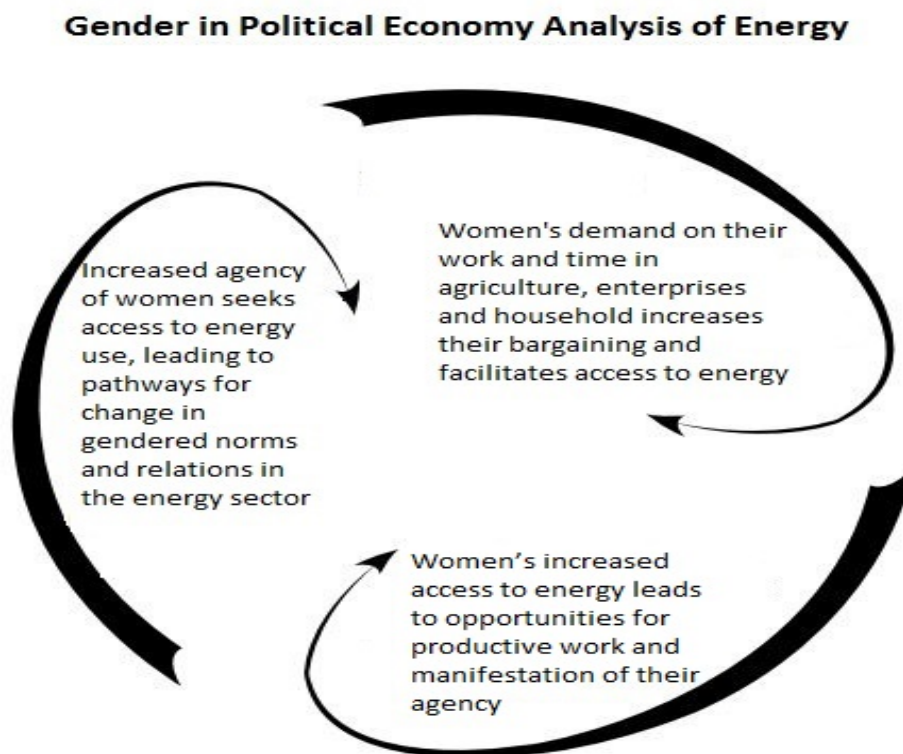
Thus, we will simultaneously analyse both spheres of social reproduction and production. This is a departure from existing gender analysis of fuel use, which has largely paid attention to fuel use in social reproduction and has ignored women's energy needs for production in agriculture and small and medium enterprises. Our proposed study emphasizes the link between energy-use in the two spheres of work: social reproduction and production. It puts forward the hypothesis that women's engagement in production and the consequent enhanced agency of women drives changes in household fuel use.

In analysing the interaction of fuel use in social reproduction and production spheres, the project seeks to go beyond existing analysis of costs and power by utilizing a gender analysis of the political economy of the energy sector. The research project seeks to understand the manner in which energy policy and practice are not just determined by existing economic and political structures, but are contingent on the interactions of a wide range of actors (policy planners; administrators implementers, both public and private; and energy users, mainly women but also men). In other words, rather than seeing only the power-poor position of women in rural areas, we see that intervention is possible, both by women themselves (using their group and individual agency in social reproduction and production) and by state and market agencies at various levels. For instance, forming groups (SHGs or SCGs), which are meso-level networks, and promoting women's market-based activities could lead to an increase in the demand for labour-saving cooking systems from women whose time is now needed for production. The increased demand for LPG may in turn lead supply agencies to increase supplies in what are considered remote areas.

In the context of political economy and gender relations of energy use in the study areas, our analysis will be done at three levels: i) **Macro**, where the formulation of energy policies and programmes by central and state governments takes place; ii) **Meso**, where energy policies are implemented and administered by networks of the state, market and community and social norms that influence energy policies and practices; and iii) **Micro**, where energy services are delivered to individuals and used at the household level. These three levels cannot be looked at in isolation from each other, but in their interaction in energy policy and practice. Importantly women's agency, through organizations of groups of women (SHGs and SCGs) and individually, will be looked at to see how they can influence both energy policy and practice. Thus, we will also analyse the manner in which power and voice (or the lack of) at these three levels interact to produce the gender responsive energy outcomes in rural areas of India and Nepal. The evidence from a cross-section of women and households and rural locations differentiated by degrees of remoteness, will help formulate approaches to increasing women's agency in securing desirable energy outcomes.

4.2 Main Research Questions and Sub Questions for Phase 2

The Scoping Study is not to be seen as the end of the process of exploring gender issues in energy use. Rather, this is the beginning of a struggle to understand the complexity of gendering of political economy and its outcomes for women and men in remote rural areas in India and Nepal.



Most available research on gender and energy focuses on women's inclusion in energy policies and infrastructure development. Our focus is on how demand on women's work and time in agriculture, enterprises, and households facilitates energy access; and in turn, women's increased access to energy leads to their participation in productive work and manifestation of their agency. Further, the increased agency of women seeks access to modern energy use in both production and social reproduction (household work and unpaid care), leading to mechanisms and pathways to gender-egalitarian change in norms of the energy sector.

The central research question is: How can women in rural areas be empowered to gain access to modern energy services in both production and social reproduction activities? Under this overall research question, we have the following sub questions (Q) and hypotheses (H) for the research:

- Q1: Does gendering the political economy make a difference to how we understand women's agency in energy use?
- H1: Gender responsive political economy points out that it is necessary to go beyond economic structure to identify the political and institutional factors of power that can be utilized by women to increase their agency in energy policy and practice.
- Q2: What are the political economy factors that facilitate women's agency in the use of energy and how can they be strengthened?
- H2: Women's power, resulting from participation in production as well as asset ownership and control over the results of production, facilitates women's agency in the use of energy.
- Q3: In what ways do socio-economic and political processes determine gendered access to energy in agricultural production and related enterprises? To what extent women are free to use energy made available by government and market agencies?
- H3: Women's ownership and control over land and agricultural household production, access to land administration and markets, the presence of women collectives (SHGs in India and SCGs in Nepal) and village IT centres, as well as male migration change energy access and use by women.
- Q4: How do energy use decisions interact with changes in demands on women's time for social reproduction and production?
- H4: Changes in demands on women's time increase the opportunity cost of women's time and induce a transition from conventional to modern forms of energy.
- Q5: How do gendered social norms in formal and informal organizations, impact on government agencies and private sector operators in formulating and implementing energy policies particularly for remote rural locations? What are the mechanisms and pathways leading to gender-egalitarian change in social norms?
- H5: Women's agential and associational power, largely acquired through collectives (SHGs, SCGs) and ownership of productive assets can influence social institutions, norms, government agencies and the private sector in their energy policies and practices.

The research questions and hypotheses will be tested through empirical research and knowledge, which will be acquired through mixed methods of field data collection and analysis (quantitative and qualitative) in combination with end users' perspectives. The research questions will be initially explored in open-ended focus group discussions to see if factors not considered so far come up as being important. The tested results will form the basis of policy advocacy to strengthen women's agential power to increasingly undertake production and reduce time and drudgery in social reproduction through labour-saving, efficient and clean energy technologies.

4.3 Methodology for Phase 2

4.3.1 A Framework for Analysis

The point of bringing gender into the political economy analysis of energy is to see how gendering of power as structure and countervailing power as agential power play out in the manner in which

energy is used. Can the growth of women's power or agential action result in a shift to using cleaner fuels?

Feminist political economy has grappled with the problem of "the exclusion of social reproduction from what is recognized as work" (Bedford and Rai, 2010: 7) and the resulting invisibility of much of women's work (Waring, 1989). The manner in which production and social reproduction can be combined in political economy analysis remains a challenge.

We propose to deal with this by integrating all kinds of work by the time spent on it. Time, like money, is fungible. It can be used to undertake various kinds of work. But as various time-use studies show, the manner in which women use their time differs from the manner in which men use their time (Antonopoulos and Hirway, 2012). Women both spend longer hours at work and also devote a greater portion of their time on tasks of social reproduction (largely including cooking, care and other domestic work) and on production for household use; while men spend more of their time on income-earning and market-based production. This difference is particularly marked in remote areas that are poorly connected with markets.

Women's time at work is divided into two types: social reproduction and production work, whether it is unpaid family work as in agriculture, or paid work in the market-linked enterprise, or as self-employed or wage-earning employees. Dividing and integrating these two types of work into women's time, will be the basis for our analysis of the manner in which women's time use interacts with energy alternatives. In fact, the interaction of women's energy use is not merely linked with women's own time, but also with men's time. For instance, the high migration of men in Kailali district has reduced the household time available for subsistence rice production, leading to women's use of power tillers for ploughing, pump sets for irrigation and fans for winnowing and threshing of agricultural produce, in place of the older human-cum-cattle-based agricultural tasks.

But in the interaction between different types of time use, we put forward the hypothesis that production time is the dynamic element. As women increase their time in production, they are forced to reduce the time spent on reproductive work. This would push them to shift them from collecting fuelwood to buying it or switching to kerosene use; with even further increased time in production there would be pressure to adopt labour-saving and clean technologies, such as LPG. The key proposition is that an increase in women's time in production increases pressure to economize on time spent in reproductive work and thus encourages the adoption of labour-saving technologies, such as LPG.

In some villages we will have to capture and interpret time, based on the division of the day such as when "it is dark in the morning", or "when the sun is high" or the "decline of the sun", the "time to go to bed." It is also necessary not to double count, being sensitive to the notions of time and seasonality.

Changes in women's energy use patterns are not only responses to changes in the distribution of work among different uses, but are also created by women's agency in accessing different types of work and challenging dominant gender relations. These challenges are the result of multiple strategies that women use within the family or household, community, the market place, state and society as a whole. Combining household and community spheres, women's SHGs have also become a way to change economic roles through entering self-employment in market-based development. Mobilization by women has turned political attention to some issues, such as policy change for land and asset ownership, domestic and public violence. It could also be a way to bring about some changes in fuel use, for instance, by pushing for a switch from fuelwood to a clean fuel, such as LPG, in order to reduce indoor air pollution.

Our framework is developed using two variables, women's time and energy use. We depart from earlier analysis in not looking at time used in cooking (which includes both time in acquiring fuel and in cooking itself) separately, but in interaction with other demands on women's time in agriculture and enterprises; in this interaction, however, it is demand on time for production that is the dynamic element.

Fuel used within the household is of various types, solid (different types of biomass) and non-solid (LPG, electricity, kerosene). In understanding changes in fuel use, it seems useful to utilize a characterization of fuel in terms of commercial or non-commercial. Non-commercial fuels are those that are collected, such as wood, crop residue and animal dung, while commercial fuels are electricity, LPG, and kerosene. But it is important to note that some solid biomass fuels could also become commercial, i.e., wood is often purchased, in which case it is commercial.

The reason for making the distinction between commercial and non-commercial fuels, is that once wood becomes a commodity, then its use is also subject to the money metric. Then the cost of wood can be compared directly with the cost of LPG or kerosene, etc. But when wood is collected then the manner of computing its cost is in terms of the labour time used in its collection, which does not lend itself to a direct money comparison. One can make an indirect, or opportunity cost, comparison – the income that could be earned in the time otherwise spent in collecting wood. But when, for whatever reasons, wood is bought then this transaction lends itself to a direct money comparison with competing fuels.

We observe the above two variables (women's time and commercial energy use) at three levels – low, medium and high. The meaning of low, medium and high in terms of the demand on women's time in production is self-explanatory. But the use of low, medium and high in terms of the commercialization of fuel needs some explanation. Low commercial energy use is when most fuel is collected. This would mainly be wood, but could also include crop residues and even animal dung. Some energy for lighting, such as kerosene or electricity, may be purchased. In the medium commercial energy category even the wood, or a lot of it, is bought as observed in case of peri-urban settings. The fuel is the same, wood, but it changes from being collected to being purchased; which, as pointed out above, brings the money metric into play. The medium level could also be one of a shift from a self-made to a manufactured stove (ESMAP, 2014); or a combination of different fuels, such as both wood and kerosene, or wood and LPG. The high commercial energy category is when all energy is purchased. While there may be some wood or other solid biomass in this mix, given the superior efficiency and time-saving characteristics of non-solid, modern fuels, one would expect a substitution of non-solid for solid fuels. We do not deal with coal, which is a solid fuel. It is also not relevant as household fuel in either India or Nepal, outside of the coal-mining regions.

While we have gone beyond the 'have or have-not' binary by using three levels of commercial energy use, ESMAP proposes a five-tier measurement of access. This five-tier access has been specified in the case of electricity; but for cooking solutions the five tiers are collapsed into three tiers, namely, self-made stoves, manufactured stoves and non-solid fuel (biogas, electricity, LPG) stoves. From these three types of cooking solutions, five tiers are generated by having intermediate combinations of different types of solutions, i.e., combination of primary and secondary stoves. In both rural India and Nepal we do find households using combinations of different cooking systems, such as combining an LPG stove with a wood stove, with the former being the primary stove in some cases and the latter being the primary stove in other cases. In the course of field testing of the survey instruments we will check to see whether three or more tiers make empirical and analytical sense.

In an agrarian economy with one main agricultural season and some extent of gathering of forest products, the demand on women’s time for production is low (**L**). This goes up as women take up some non-agricultural or non-farm enterprises (NFEs), or begin a second crop, leading to a medium (**M**) demand on women’s time. This would go up even further as NFEs grow in scale. Or, if there is male out-migration, requiring women to manage all agricultural tasks, even if ploughing is still socially tabooed for women. In this situation the demand on women’s time in production would be high (**H**).

We put forward the hypothesis that energy use decisions within the household are largely related to the demand for women’s time in production, though there is also the effect of *doxa* or default options in decision-making. The reason for such a connection between the demand for women’s time in production and the type of energy used is that the opportunity cost of women’s labour goes up with the increasing income from labour in additional types of production (Kelkar and Nathan, 1997; Kelkar and Nathan, 2005; Clancy et al., 2011).

With a low demand for women’s time in production, there would be continued traditional collection of wood for cooking, even if combined with electricity or kerosene for household lighting. The level of commercialization of energy acquired by the household would be low (**L**). With an increase in the demand for women’s time in production, there might well be a continuation of fuel wood use for cooking, but with a role for the purchase of collected wood. Within or between villages there could be an emergence of wood-selling households as against wood-buying households. This is a middle level (**M**) of commercialization of energy used by the household.

At the highest level of demand for women’s time in production, there would be a complete shift to commercial energy, or a high level (**H**) of commercialization, which may or not be with modern fuels. Particularly in remote areas, with high transport costs, women with a high production demand on their time may continue to use wood as cooking fuel, but buy it from the market. We can put forward the hypothesis that women in this situation, i.e., of buying wood for fuel, would be ready to switch from buying wood to buying LPG. The capital costs of the latter are high, but the running costs of fuelwood are much higher.

The above structure of household fuel use can be represented by a 3x3 matrix, with demand for women’s time in production in the vertical columns and commercialization of energy use in the horizontal rows, each of these takes three values, Low – L; Medium - M; and High - H.

Figure No.1: Women’s time demand in production and commercialization of household fuel use

		Demand on Women’s Time in Production		
		L	M	H
Commercialization Of Energy Use	L	[a] L, L	[b]	[c]
	M	[d]	[e] M, M	[f] H, M
	H	[g] L, H	[h]	[i] H, H

Note: The first letter refers to women’s time demand and the second letter to the commercialization of energy use. The letters in square brackets refer to the cell.

One would expect that with a high level of demand for women’s time in production there would also be a high level of commercialization of cooking fuel, leading to the bottom right-hand cell [**H, H**]. But, the high capital costs of investing in a stove and LPG connection may deter such a shift, and instead lead to a continuation of the default option of high wood use, even if it is wood purchased from the

market, as in cell f, **[H, M]**. In such a situation, a capital subsidy for LPG investment is likely to be successful. Where households are buying cooking fuel, since the variable costs in using LPG are lower than that of purchasing wood, a capital subsidy will work in bringing about a shift from wood to LPG.

From a policy perspective, we may say that promotion of LPG through a capital subsidy is likely to be successful where women facing time constraints because of the high production demands for their time. This high demand on women's time in production may be due to their taking up additional agricultural activities (such as vegetable cultivation in the second agricultural season) or entering into household industry or non-farm enterprises, as is seen in some parts of India. Or, it could be due to male out-migration, as in Nepal. A capital subsidy for LPG use could promote a shift down along the H column to the **[H,H]** cell, with LPG use for cooking.

In addition, an economy where there is a substantial buying of fuelwood, meaning it would be in the M Row, is also one in which policy or capital subsidy could promote a switch to a cleaner energy. When wood is being purchased, it obviously is not being collected with unvalued labour. With the money-metric of fuel use coming into the picture, and a switch in fuel use being inhibited either by the high capital cost of LPG, or by men's domination in household decision making, policy of a capital subsidy and/or household level assertion by women could bring about a switch to cleaner fuel.

4.3.2 Some Empirical Evidence

Is the M Row of a medium-level of commercialization of energy empirically relevant? Indian household data show that a substantial proportion of rural households purchase wood for fuel (Dahlberg Global Development Advisors, 2015). This shows the empirical relevance of the M Column in analyzing gender relations in the political economy of fuel use. Earlier studies in Lao PDR (Nathan, 2003) and China (Kelkar, 2004; 2009) showed that where women became main income earners (with weaving of shawls and tourism enterprises respectively) some households or villages became sellers of wood. Thus, we can conclude that Row M is empirically relevant.

In a stagnant rural economy, it would be difficult to successfully implement a policy of a capital subsidy for LPG. In the many schemes for such promotion, including the large-scale World Bank supported *Deepam* programme in Andhra Pradesh, women did not continue LPG use after the initial free cylinder (World Bank, 2002). At times, even during the subsidy period, they ended up selling their stove and cylinder rights to tea-shop owners or other such commercial users of LPG. With a low demand on women's time, there is a low opportunity cost of women's labour and the default option of women collecting wood for cooking continues to be the norm.

When the rural economy is in the **[L,L]** position, then the policy conclusion is that a successful switch from wood to LPG for cooking requires not just a capital subsidy, but the subsidy needs to be accompanied by the development of women's involvement in new areas of agriculture or enterprise.

Given this structure of the relationship between women's time use and energy choices, what is the role of women's agency? How can women's micro level agency change this picture? Earlier we noted that there is scope for women's agency by increasing women's involvement in different types of production work through credit secured through SHGs or SCGs. This increase in involvement in production activities means an increase in the demands on women's time, represented in terms of Figure 1, and what this means is that women might move in a rightward direction.

Assuming that an increase in women's production involvement results in an increase in bargaining power within the household, then women could push for a transition to labour-saving fuel. Observations in some rural locations bear out the possibility of such related changes in demands on

women's time and fuel type. In China, women, heavily involved in tourism activities, shifted from collecting to purchasing wood for fuel (Kelkar, 2004). Hani women involved in tourism in Xishuangbanna also shifted from three-stone stoves to improved stoves and from collected to purchased wood for fuel. In both cases, women in villages higher up on the hill and not involved in tourism, not only continued to collect wood but also emerged as sellers of wood (Nathan et al., 2012). A similar transition was observed in some Lao villages on the border with Thailand. Those women who took to weaving for income stopped collecting wood, while those who did not, sold wood (Nathan, 2003).

In our study areas, in Kailali in Nepal, women whose husbands had migrated undertook most of the agricultural tasks and thus felt increased pressure on their time. Some of these women stopped collecting wood and instead purchased wood. In each of these cases what we see is that a change in the production demands on women's time led to a change in the fuel use pattern in social reproduction, with a switch to purchased instead of collected wood for fuel.

This shift from collecting to purchasing wood is a partial transformation in the way of securing fuel. Though the type of fuel remains unchanged there is a saving of labour in that time spent on collecting wood is saved. Further, one could put forward the prediction that with an even further increase in demands on women's time, there would be a switch to an even more labour-saving fuel, such as electricity or gas. In one instance, when a school teacher's working hours increased with higher responsibilities there was a switch from purchased solid biomass fuel to LPG. This was also observed in some women in peri-urban Jeypore, Koraput, India, who are in full-time jobs. One would expect many more such instances of change in fuel use as increased production demands on women's time stabilized. We now turn to the manner in which the framework set out above will inform our field investigations.

4.3.3 Approach to Field Investigations

Based on our earlier work for IFAD and UNIFEM (Kelkar and Nathan, 2005), we tend to agree with Batliwala that "no single tool or method can respond to all our learning needs" (2011:5). To capture the complexity of change in gender outcomes in the remote rural regions of India and Nepal, we propose the following assumptions underlying the field investigations:

Energy policy is complex and contested at design and implementation phases of policy in India and Nepal.

With increasing attention being paid to reducing gender inequalities, evidence-based research on the impact of energy policies on gender inequalities could make some impact on the formulation of energy policies in the two countries.

Gender norms are likely to change even more slowly than policies (Sen, 2010). But organizing women into SHGs and other such organizations as well as increasing their role in production activities is likely to bring about changes in women's use of non-solid energy, for both social reproduction and production. These changed practices can lead to changes in social norms as a result of women's increased aspirations and assertion of their rights to access energy and production assets and thereby, bring about gender responsive transformation in policy and practice of energy access.

The macro level is the one at which policies are formulated, including both the national and state (India) or district (Nepal) levels. The meso level is that of administration and markets for particular types of energy, commercial organizations and other networks. This is also the level of the formation and impact of networks of women and of norms regarding gender roles and energy use. Thus, the

meso level includes the important role of women's groups, such as SHGs in India and SCGs in Nepal. The micro level is that of the individual woman and household at which energy use decisions are made. The energy use outcomes we are looking at those of use of modern/clean fuels, electricity and LPG for household use, and mechanical energy (through diesel or electricity driven pump sets, agro-processing and transport). We want to see how these energy outcomes are related to levels of demands on women's labour time.

We have identified three levels of use of commercial energy use –Low (L), Medium (H) and High (H). Stratification of households for statistical analysis will be by use of commercial energy – L, M and H. The household questionnaire will study the household characteristics of those in L, M and H categories: the extent of demands on women's labour time for social reproduction and production; types of energy used for cooking, lighting and production; women's time spent on collecting fuel; expenditure on fuel; membership of women's groups; women's roles in household decision making; male migration; income.

Women, it is expected, do not just adopt different fuel systems on an individual basis. With women's SHGs (India) and SCGs (Nepal) being the main form of organization of women in credit-based production activities, it is expected that there will be variation in villages based on their proximity to market centres. Proximity here is not just a matter of being physically close to a market, but more of having all-weather access to the daily market.

Gendering of political economy analysis is carried out at three levels, macro, meso and micro, including a study of the interaction of all these levels. In setting out the methodology for a gendered political economy analysis we start with the macro and meso levels and then go on to describe the micro level. The macro level of analysis is that of national, state and district levels. The meso level is that of markets, administrators (including local administrators), civil society and villages. The micro level is that of individuals, women and men, and households.

Macro and Meso Analysis

The methodology for the macro and meso analysis is largely developed from that of the Policy Practice (2015), along with the Political Economy Analysis of Climate Change Policies (known as PEACH methodology) (Schmitz, 2012), and modified by Morris and Martin (2015) wherein they also introduce value chains into the analysis. Our important addition is the use of gender analysis to identify what benefits or constraints there are for women in these policies and practice of implementation.

Identifying the development problem of energy: Persistently poor development outcomes as reflected in the poor utilization of clean energy/LPG by women in rural locations in India and Nepal. The **diagnosis** of the problem has three components: (i) structural factors; (ii) actors, their power and motivations through a value-chain analysis; and (iii) dynamic factors, complexity and change

The **structural analysis** will include an inventory of actors, who will be inserted into energy value chains. The relative power of these actors will be analysed through their engagement with formal and informal institutions (understanding institutions to be the rules governing the allocation of resources) that work at different levels. Many gendered norms influence decisions at all levels and work through informal rules in allocation of energy resources. Thus it will be necessary to identify the allocation rules functioning at different levels.

Actors, their power and motivations through value-chain analysis: The value chain approach requires and helps in identification of key players in different segments of the value chain: i) generation / production; ii) transmission; iii) distribution; and

iv) consumption. It may be necessary to add in the usual value chains segments, the roles of women and men in the analysis. It may be necessary to draw up different value chains for electricity, LPG and even fuelwood. This would be followed by an identification of key drivers, women and men as the lead actors.

A value chain approach also allows for struggles between different actors in the chain, both within a segment (i.e., at the horizontal level) and between segments (i.e., at the vertical level linking segments). It will be the basic analytical approach to linking the macro, meso and micro levels of policy formulation and practice. The value chain analysis will be particularly important in seeing how the different levels (macro, meso and micro) link with each other, and where power interventions can occur to change the dynamics of the particular energy chain.

In energy policy, as in other policy formulations, there is usually a coalition of interests that comes together to support or oppose a policy direction. Thus it is necessary to map coalitions of women and men as they come together representing their different energy-specific interests.

Dynamic Factors, Complexity and Change: The identified forces for change may well shift in importance over time. Consequently as done by Morris and Martin (2015) it is necessary to identify periods or phases of policy formulation and implementation. For instance, in the case of Nepal, the period after the end of the monarchy saw the growing importance of various types of inclusivity in energy policy. Consequently this can be identified as a new policy period in the political economy of Nepal's energy policy.

With regard to the potential for change, we would like to assess the forces for change. For example, the impact of women's collective action at micro levels, having a spread effect, both horizontally and vertically; a change in the thinking of a gender-inclusive energy policy; a change in international and national coalitions in favour of clean energy. Further it is intended to assess the probability of various outcomes under different conditions.

A crucial part of this analysis will involve the linking of the different levels, macro, meso and micro, in order to see how and where changes can be introduced. Changes can start at both the macro level (changes in national policies); or, at the meso and micro levels (changes at intermediate and base levels, having an impact, over time, on macro policy).

Linking Macro, Meso and Micro levels: we put forward the following hypothesis of the relational link starting from the **micro level and going up to meso and macro levels:**

- Agential action at micro level (individual women in their households) is enabled by meso-level organizations of women's groups
- Meso-level actions and organizations can change norms and in some cases macro policies and implementation, for example the power of women voters can lead to women's energy access issues becoming election issues; women mobilized in securing rights to assets and facilities, such as modern fuel, infrastructure, land, water and so on.
- Evidence-based policy advocacy as an influencing factor (JFM and SHGs starting as projects at the micro level and both are now macro policies)
- Macro policy can be influenced by micro- and meso-level actions, a number of policies in India and Nepal have started at the pilot levels e.g., MGNREGA, SHGs, JFM.

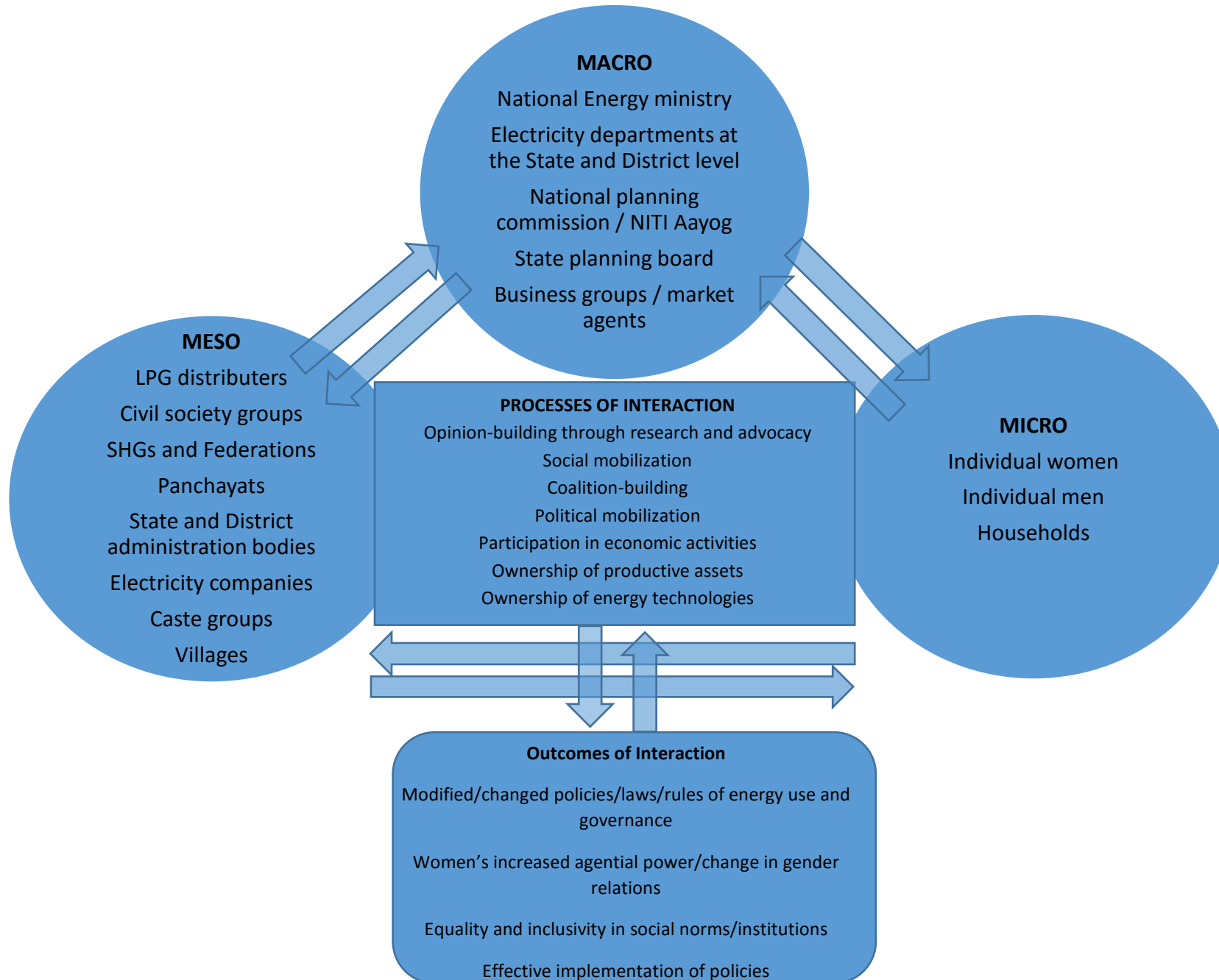
Macro policies are filtered through the meso to the micro levels. There is a top-down connection from the **macro and meso levels to micro level**

- National and international development concerns for clean cooking energy.
- The Government of India's efforts at providing subsidized LPG connections in rural areas.
- Attempts at reducing women's work burden in agricultural production.
- Gendered ways of seeing the world affect the energy policy implementation where the opportunity cost of women's labour at the micro level is low, then there have been reports of failures to sustain the change in cooking fuel. Policies for provision of electricity, however, have been more successful, but regional political factors influence the spread of rural electrification.

While we start with these approaches, we will look into the possibility of other approaches too which may be more appropriate in understanding the gender dynamics of change in energy policies. Of course, there is also the possibility of a simultaneous existence of both top-down and bottom-up changes. But, it is our understanding, that the role of bottom-up changes by women is very much underestimated in both research and policy.

The value chains linking the different levels (macro, meso and micro) is a crucial part of political economy analysis. This is particularly important in the use of gender analysis, since unintended consequences may not reveal themselves without such a linking up of all the three levels. But in the linking we emphasize that the relationship is not only one-way, from the macro, filtered through the meso to the micro level of women and their households; but also the other way, from initial micro actions of women at the base going up through the meso and influencing macro policies. The energy value chains are dynamic and it is important to identify the different spheres of macro, meso and micro, at which interventions can be made and can change the developmental outcomes.

MACRO, MESO AND MICRO INTERACTIVE PROCESSES AND OUTCOMES



Investigation Methods for Macro, Meso and Micro Levels: Investigation of macro, meso and micro levels, and of connections between all the three levels, will be carried out through: i) review of policy documents; ii) key informant interviews; iii) village schedules, and iv) questionnaire-based individual (women and men) and household surveys. The key informants to be interviewed will include present and past energy policy makers, officials of private sector and para-statal organizations involved at some level of the value chains, traders and energy consumers at local levels, members or officials of the SHGs and SCGs (who will in any case be interviewed for micro and meso level investigations), CSO and academic experts in energy debates, and, if possible, officials of multilateral financial organizations, such as of the World Bank and the Asian Development Bank involved in financing investments in the energy sector.

For meso-level investigation, village schedules will be filled in 10 sites, 1 in each district, 4 in India and 4 in Nepal and 2 peri-urban areas, each in India and Nepal. These are aimed at investigating links with policies and their implementation, and the leakages and slips that occur along the way. The sites will be chosen in order to present a variety of situations, basically more and less remote in each district of the study and one peri-urban area. By taking a variety of sites we will be able to assess both the manner in which identical energy policies have different impacts in more remote and less remote locations and the manner in which political pressures from below too have different impacts on macro-level policies.

Review and Analysis of Policy Documents: A review and analysis of the policy documents and reports of all organizations connected with the formulation and implementation of energy policy will be a key resource for the study of the political economy of energy at the macro and meso levels.

In each village there will be:

- **Village schedule** covering population, ethnicity, connectivity, major economic activities, nearness to regular market, access to electricity, major production activities (agriculture, home-based industries/enterprises), recent changes in economic activities, extent of migration, existence of women's groups and their activities, energy programmes in the village, role of local administration and of women in them in administering energy programmes, norms regarding decisions about energy, types of energy used, energy markets in village, and peak economic seasons.
- **Focus Group Discussions (FGDs)** Two FGDs will be conducted in each research site, a total of 10 with women and 10 with men in each country. The FGDs will cover the major norms in the village with regard to community and household decision making, changes in these norms, impact of improved communication and market development, migration and its effects, changes in fuel use in the village, the people's understanding of the incidence and causes of Acute Respiratory Infection (ARI), role of women's groups (nature and limitations of different women's groups), and other civil society groups. The purpose of the FGDs is to get an idea of the processes of change in gendered norms in energy use in the village/community and in wider society in general.
- **Key Informant Interviews:** In each study area there will also be key informant interviews with administrative and energy officials, energy supply providers, any corporations and businesses active in the area.

Policy Stakeholder Interviews: For macro-level investigation there will be similar key informant interviews with present and past energy planners, policy decision makers, researchers and civil society organizations active in the area of energy policy.

In order to strengthen the project team's political economy analysis, we will engage three consultants, one each in India, Nepal and South Africa. They will work with the project team's own analysts to produce background papers on the gendering of political economy of energy, one each for India, Nepal and South Africa. A short-term research associate has been identified to work in Cape Town, South Africa. She has agreed to conduct relevant interviews of energy officials and to provide a brief overview of political economy of energy in the country. The inputs from these papers will be used in research papers produced for publication in 2016-2017.

4.3.4 Selection of Research Sites

The criteria for selection of research sites are: (1) districts that are remote with poor infrastructure development; (2) districts that are better connected and represent an intermediate level of infrastructure development; and (3) districts that are well connected with a high level of infrastructure development.

We have selected rural regions for the study on the basis of their extent of remoteness or connectivity – very remote, moderately remote and well-connected. Study areas in the three levels of remoteness are: (1) remote (Koraput and Mayurbhanj in Odisha, India and Dhading in Nepal); (2) moderately remote (Wayanad in Kerala, India and Kailali and Kavre Nepal) and (3) well-connected (Dindigul in Tamil Nadu, India and Rupandehi in the Lumbini tourism circuit in Nepal).

We have chosen to concentrate on economically poor women in remote areas, because they require a resolution of the most difficult issues of dealing with gender bias in already politically marginalized remote areas with very poor human development indicators. But, as a research project seeking to secure evidence-based policy suggestions, it is necessary to have a contrast of types of areas that are studied.

The remote regions (Koraput and Mayurbhanj in Odisha, India and Dhading district in Nepal) are dominated by indigenous peoples and other marginalized caste groups, and are characterized by: (1) poor infrastructure and connectivity; (2) a higher incidence of poverty; (3) limited access to electricity; (4) limited agricultural seasons and high level of surplus labour; and (5) high usage of wood and crop residue as cooking fuel leading to adverse health of women, children and deforestation. All of this leads to lower productivity, since they mainly rely on human and animal power in un-irrigated fields. It also leads to poorer educational and health outcome, since there is both inadequate energy infrastructure and high indoor air pollution. Importantly, in Mayurbhanj, women SHGs have the responsibility of distribution and management of LPG connections.

In Dhading district, out of 50 villages, only 44 have road connectivity, that too on seasonal roads. The district has a high level of migration. 85% of the rural households use biomass for cooking and 63% of rural households have access to electricity for lighting.

The moderately remote areas (Wayanad in India and Kailali and Kavre in Nepal) have: (1) all-weather connections with main markets; (2) high transport costs; (3) higher demand for women's labour through more agricultural seasons and related enterprises; (4) higher incidence of electricity connections than

the remote areas: and (5) higher incidence of clean cooking fuel. In Wayanad, India, all villages and 81% of rural households have electricity but 87% of rural households use biomass for cooking. In Kailali, Nepal, 70% of rural households have electricity, while 86% rely on biomass. Kavre is one of the first districts where the Rural Energy Development Programme (REDP) was started in late 1990s by the Nepal government in collaboration with United Nations Development Programme with the objective to improve rural livelihoods through the promotion of rural energy systems. REDP developed alternative energy technologies such as micro-hydro plants, solar plants, biogas plants, improved cookstoves and lately LPG.

The well-connected rural areas (Dindigul in Tamil Nadu, India and a tourism centre in Rupandehi district, Nepal) have (1) reasonably good infrastructure and connectivity; (2) lower incidence of poverty; (3) almost universal access to electricity; (4) high demand on labour, including women's labour; and (5) low usage of wood and crop residue as cooking fuel.

In Dindigul district, India, 87% of rural households have electricity but only 26% of rural households use LPG. In Rupandehi 81% of households have electricity but 61% use biomass (wood and crop residue) as fuel.

4.3.5 Selection of Villages

Selection of Villages for Micro Study: In each country, quant-qual micro research will be carried out in a total of 5 research sites (4 villages and one peri-urban area).

The five research sites in India include: i) A remote village, with poor infrastructure in Koraput district, Odisha; ii) A village where LPG distribution is run by women SHGs in Mayurbhanj district, Odisha; iii) A village with adequate infrastructure and connectivity in Wayanad district, Kerala; iv) a village adjacent to a market centre and good connectivity in Dindigul district, Tamil Nadu; and v) A peri-urban area in Jeypore municipal centre in Koraput district, Odisha.

The five research sites in Nepal include: i) A remote village, with poor infrastructure in Dhading district; ii) A village where the Smokeless Cookstove Project is run, and which has poor infrastructure and connectivity in Kailali district; iii) A village with inadequate infrastructure and limited connectivity in Kavre district; iv) A village adjacent to a tourism centre and good connectivity in Rupandehi; and v) A peri-urban area in Ghoda Ghodi municipal centre in Kailali district.

Table: Research Sites and Quant-Qual Survey Instruments

Research Sites			Quant-Qual Survey at micro, meso and macro levels				
Country	District	Village (including peri-urban)	Micro Level			Meso level	Meso and Macro level
			Households (W + M)	In-depth Interviews	FGDs	Interviews with SHGs/PRIs/SCGs/village and ward leaders/small business groups	
India	Koraput	2	60 + 10	4 + 4	4	5	16 (4 in each district level)
	Mayurbhanj	1	30 + 5	4	2	5	12 (4 in each state level)
	Wayanad	1	30 + 5	4	2	5	6 at national level
	Dindigul	1	30 + 5	4	2	5	8 business groups (2 in each district)

Nepal	Kailali	2	60 + 10	4 + 4	4	5	16 (4 in each district level) 4 at national level 8 business groups (2 in each district)
	Dhading	1	30 + 5	4	2	5	
	Rupandehi	1	30 + 5	4	2	5	
	Kavre	1	30 + 5	4	2	5	
Total	8 Districts	10 sites	350 (300 + 50)	40	20	40	70 (42+28)

- The total number of villages/peri-urban will be 10 (4+1 in India and 4+1 in Nepal)
- 30 randomly selected households from each village and peri-urban areas in each district, with a total of 300 households
- In each of the villages and peri-urban areas, 5 households will have 2 respondents, 1 adult man and 1 adult woman, totaling 50 male respondents
- 3 households per village will be of single adult woman household
- 20 Focus Group Discussions, 10 with women and 10 with men (average group size of 10 participants, totaling 200 total Focus Group participants)
- 40 in-depth interviews; in each village/peri-urban area there will be 4 in depth interviews, 2 women and 2 men
- In each district there will be 5 key stakeholder/key informant interviews
- Interviews of 70 national and state level officials and policy makers and CSO network leaders and business groups: 42 in India, 28 in Nepal

Total reach: 350+40+40+200 +70 = 700 persons

4.3.6 Village and Household Studies

Household studies will be conducted in villages, each village with a size of over 50 households. This will include:

- **A household schedule** that will be administered to 30 randomly selected households covering family size, dependency ratio, household income and women's control over this income, education of adults, health of women and infants, land ownership, economic activities of household including types of crops grown and livestock details, migration, remittances, production and social reproduction roles of women and men, women's and men's working hours and their distribution between social reproduction and production, recent changes in working hours of women and men, membership of social groups, role in village leadership, role in energy programmes, economic activities undertaken with loans, types of fuel used by household, expenditure on fuel, hours spent in collecting fuel, any experiences with improved cook stoves, recent changes in fuel use, incidence of ARI (Acute Respiratory Infections) in women, men, girls and boys.
- Out of the 30 households, 5 households will have 2 respondents, one adult man and one adult woman to get a gender-differential perspective on women's energy access.
- If possible 10% of households (or 3 households per village) will be single adult women households.

Key informant interviews (KII) will be conducted in each village. The KIIs will be used for meso analysis, but they will feed into the micro analysis.

The collected data will be analyzed using statistical packages, such as SPSS or STATA. In a preliminary manner the main explanatory variables are: economic activities of household, household income, women's time use, connectivity of village, proximity to a regular market, migration, the existence of women's groups, female-headed households, energy programmes, and energy markets. The main outcome variables are household fuel use in social reproduction and production, incidence of ARI, commercialization of fuel supply. A multi-variate analysis will be carried out to see the relative importance of the explanatory variables. Data from the FGDs and key informant interviews about village level information will be analyzed with qualitative methods.

Review of literature will continue with attention to gender analysis of political economy of energy and of energy policy changes in the two countries. **Attention will also be paid to drawing lessons from South Africa's experience of achievements and challenges in the provision of clean and efficient energy to rural women and their households.**

4.3.7 Plan for Dissemination of Research and Involvement of Stakeholders

Potential Application to Other Rural Regions: The proposal has an emphasis on women's access to clean and more efficient energy in the selected remote rural regions. These remote areas are poorly connected and have low levels of economic development. The results from our research study would be applicable to other such remote rural regions, both in the two countries of our study and in other countries of South Asia, such as Bangladesh and Pakistan.

Wider Application of the Research Method: Our analysis stresses the need to jointly consider women's activities in both social reproduction and production, and the interaction of women's time in these activities with fuel use decisions in both social reproduction and production, with time use in production as the dynamic factor in fuel use changes. This analytical approach to gendering the political economy of energy use would be of wider application in assessing improvement in agential power of women.

Avoiding Duplication with Other Research Projects in this Programme: Since there are Indian counterparts of RA1 and RA4, a joint meeting of RA3 with RA1 and RA4 has been planned to discuss research plans of work with policy makers and other stakeholders in Delhi in early 2016. Subsequently, four meetings at the national and state/district level will be organized by RA3, two in India and two in Nepal.

Efforts at Seeking Favourable Response from the State Government in Odisha: Faced with the major challenge of reducing poverty and inequality in remote rural areas of Odisha, the state government is likely have a favourable response to our research results. In July 2015 two members of the research team (Rengalakhsmi and Govind Kelkar) had a preliminary meeting with high level officials in the state administration. During these discussions we received a positive response of cooperation about facilitating our study and policy consideration for research funding from the Department of Panchayati Raj (Village government) and Odisha Renewable Energy Development Agency. The Odisha Rural Development and Marketing Society (ORMAS) under the aegis of the Department of Panchayati Raj is enabling women's access to LPG connections in 4 districts of Odisha.

ORMAS has a plan to scale up this intervention, leveraging women's credit from SHGs. Reportedly, the SHG members who were engaged in LPG management reported that they were able to spend more money on their children's education as well as on their own health and education. They were happy to report about their newly acquired management skills, freedom of mobility and social prestige and ability to interact with community members and officials. However, ORMAS officials saw challenges in "the attempted monopoly of the corporates, changing policies of the Central Government and people's acceptability, especially of tribal men, as the deposit amount for the new connection was increased to Rs. 3,000" (Interview notes with Executive Director, ORMAS, July 29, 2015).

The Odisha Renewable Energy Development Agency (OREDA) of the state government is engaged in promoting solar pumps for irrigation at subsidized rates of 20% for small and marginal farmers and solar lights in Adivasi villages, where grid electricity was not available, especially in the districts of Koraput, Mayurbanjh, Rayagada and Sundergarh. Local youth were trained on the sales and service of solar systems, but no specific attention was given to women.

The Government of India has recently (September 2015) announced that as part of its commitment to reduce GHG emissions, it will reduce the incidence of wood fuel use from the current 40% of all rural households to 5% by 2030. This provides scope to provide inputs for the design of a sustainable energy transition by understanding the need for a gender responsive policy for energy access and its implementation.

Tracking the Praxis of Policy Change: How should our policy focused efforts be measured or assessed? We have planned to conduct an ongoing monitoring activity to assess the outcomes of our research-based advocacy inputs for change in rural women's position in the energy sector. There are two elements to measure: (1) advancement in women's collective and individual agency to access energy for social production and production; and (2) gender-sensitivity and women-specific energy supply through policies and implementation efforts at national, state and district levels. Our analysis of these two elements is likely to show changing gender relations and its limits within home and outside. The characteristic features of the gender-transformational change will be explained by the numbers of women and men influenced by the change, individual or collective examples of such change, and aspirations for a gender transformational change through focus-group discussions and/or key interviews. The context-specific direction and measure of the change will be discussed twice a year with the field teams by the lead researcher and the political economist in the select research sites in India and Nepal. The tools of such analysis will draw upon the Gender Empowerment Matrix and feminist analysis of political economy of energy policies in the two countries.

The quantitative methods used in research will help in generating statistical evidence for change in gender relations; and qualitative methods like interviews and focus-group discussions in the field will help in gathering nuanced information on experiences of women and men on the ways and processes of transforming gender relations. It is important to understand that patriarchal social norms are embedded in social power relations of inter-country and intra-country or even intra-district conditions, as well as in class, caste and ethnicity situations. An attempt will be made to demonstrate a proof of progression in advancement of women's access to energy and related decision-making i.e., agential power of women. We might have a picture of a 'messy reality' with some steps forward and some steps back about the gendered condition of women in access to energy and decision-making (Batliwala and Pittman, 2010: 5). Nevertheless, we do accept the responsibility of following the theory of change and tracking even small

positive steps in advancement of women's access to energy and their social and economic empowerment, as reflected in decision-making within social production within the household and outside in production areas of agriculture and enterprises. **Major indicators of gender-specific change in policy and praxis of energy are in the process of being developed.**

4.3.8 Theory of Change

Largely drawing from the DFID examples of Theories of Change (DFID, 2012), the theory of change informing this study is that use of agential power by women's groups in economic activities, and their pressure for better connectivity and supply of non-solid fuels for production and social reproduction, can result in changes in fuel use that both increase women's productivity and empowerment.

The availability of clean energy for women's work in social reproduction and production such as in agriculture and enterprises can result in better bargaining and decision-making within home and outside and thereby leading to an increased agential power of women. This can result in changes in fuel use that both increase women's productivity in agriculture and enterprise and reduce the negative effects of smoke pollution on health of women and their infants in the domestic sphere. An improvement in women's agency in negotiating for energy access and overcoming energy constraints is likely to lead to gender-transformational changes in terms of, a) adoption of gender-sensitive energy policies and laws and attempts at achieving gender balance in structures of energy governance; b) social awareness about the need for women's access to clean energy for cooking as well as for production in agriculture and home-based industries and enterprises; c) women's increased self-confidence and capacity to negotiate with the state and market agencies to access modern energy infrastructure for domestic cooking and production in agriculture and enterprises; and d) changes in gender norms and gender-sensitive concerns about women's ownership and control of productive assets including land, agriculture/ energy equipment, as well as unmediated access to credit for enterprise development.

The research questions outlined above (in Section 4.2) form the basis of the research activities, which are the inputs in this proposal. These research findings will be used for policy advocacy at macro and meso levels. They will also be used to conduct advocacy among women's groups and others in the villages with women and men in the research areas.

We understand that outcomes will lead to impact because: first, there is an increased receptiveness and willingness of policy makers and energy administrators to consider the evidence generated by the research in formulating, modifying and implementing policies for the energy needs of poor women and men in rural and even remote rural areas, since there is a political concern with inclusive development. Second, the process of rights claiming to non-solid fuels can be improved and women's representation in energy governance and use at meso and micro levels, can be substantially increased due to our evidence-based policy advocacy with government energy agencies, women's organizations, civil society groups, and the corporates operating in the research sites.

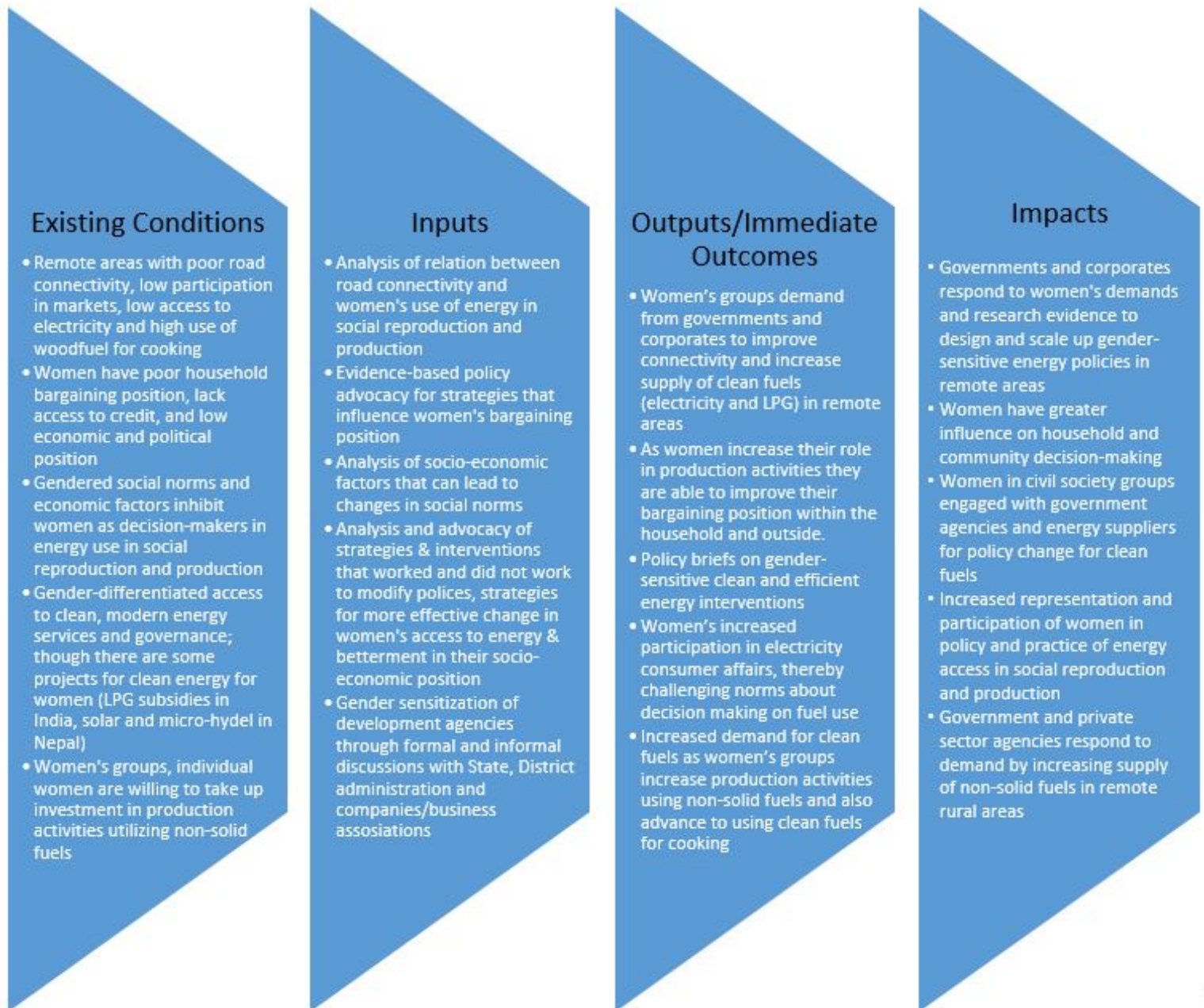
Admittedly, the **scaling-up efforts** are ridden with complex challenges, largely related to (1) poor quality of electricity supply at a high cost; and (2) delinking of RGGVY and the Rural Electrification from rural livelihoods. An effort, therefore, will be to demonstrate through our research findings that assured electricity supply to women's groups, such as SHGs, SCGs and individual women gradually leads to an increase in incomes, more so in the case of many rural women who are engaged in agriculture and in running tiny, informal enterprises. This results in a pressure on women's time, and is likely to result in a

switch from labour-intensive fuels, such as wood, to labour-saving fuels such as LPG. Of course, a transition from conventional sources of cooking (such as firewood) to clean fuels like LPG will not be easy; and will require a significant increase in understanding of patriarchal institutions and subsidized supply of LPG. But the increase in demand for labour-saving fuels due to increasing pressure on women's time is likely to push profit-oriented private players to increase the supply of LPG to rural areas. While this cannot be fully achieved in the immediate future, we hope that an effective diffusion of research results in the concerned communities of stakeholders should move policy in the favourable direction for carrying out both social production and production with clean energy.

As noted above, during Phase 2 of the research project, scaling up efforts will be concentrated in four districts in three states of India (Koraput and Mayurbhanj in Odisha, Wayanad in Kerala, and Dindigul in Tamil Nadu; and 4 districts in Nepal (Kailali, Dhadhing, Kavre, and Rupandehi). There is a high involvement of women in agricultural cultivation, production of crafts, foodstuffs and leather and textiles. MSSRF has biodiversity centres in both Koraput and Wayanad and research projects in Dindigul, and therefore, it will be possible for the research team to network with civil society organizations, development partners, corporate agencies and individual experts to build up policy advocacy efforts towards a gender-sensitive approach for energy access and women's empowerment through energy in rural regions. Likewise CRT has had project-related activities and thus a good relationship with the district administration in the 4 districts in Nepal selected for the study. Importantly, our advocacy efforts at gendering of energy policies and practices are not in contradiction with the reduction of poverty and gendered inequality and other social inequalities.

With good examples drawn from the functioning of SHGs in India and women SCGs and women drivers of 'SAFA' tempos in Nepal, the policy advocacy workshops will be conducted in cooperation and collaboration with civil society organizations, such as the Barefoot College and Practical Action, which have successfully demonstrated the ability to reach women and men from rural areas across Asia and have empowered the rural women with skills to install, repair and do maintenance work for clean energy infrastructure, such as solar lighting units, LPF and fuel efficient smokeless stoves. In Nepal, such policy advocacy workshops will include individual experts engaged in the promotion of innovative cooking and production uses of micro-hydel power in agriculture. An effort will be to make policy makers and development organizations recognize the potential of rural women in the energy sector and engage with their experience and voice in policy formulation, project design and implementation of energy policies and programmes.

Figure 2. Theory of Change



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