

Energy Poverty Scenario in India

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ABSTRACT

Energy Poverty has gained a centre stage amidst the energy security discourse in recent academia. This paper proposes that not only does the concept of energy poverty dynamises the study of energy security of a country, but also without the correct attention paid to the energy poverty scenario of a country a detailed study of its energy security dynamics cannot be undertaken. The case of this paper is India, a developing country which has become an important economy of study, especially in the context of the region of South Asia that it is situated in. In this paper, an attempt has been made to study the energy poverty scenario of India in the context of an inquiry into viewing energy security from the perspective of the citizens of the country. What are the nuances of energy poverty in a developing country, through the case of India, and how are they different from the energy poverty considerations of developed countries, forms the crux of this article. The fact that energy poverty cannot be understood from an absolute perspective, with respect to the lack of access to energy is something to be noted by academia. Energy poverty is also expressed through the lack of access to affordable energy services is also something that must be taken into account while conducting a study of the discourse. Thus, this article explores the concept of energy poverty beyond the narrow military and traditional viewpoint of tying security studies to the military considerations of a state, but rather tries to investigate concerns that make the citizens of a country achieve security at the individual level for the fruitful realization of their aspirations, especially in the context of their energy endeavours.

Key Words : Energy poverty scenario, Energy security dynamics, Fuel poverty, Energy access

INTRODUCTION

In current times, it is imperative that a country's goals to achieve development must be in concurrence with its energy policy (Dukkipati *et al.*, 2015). Energy and poverty have come to be viewed together since the week leading to the 2002 World Summit in Johannesburg on sustainable development. It has been sustained in the discussions of international academia since the early 2000s through the reports of the World Bank, United Nations Development Programme and the World Energy Council (Pachauri and Spreng, 2004). Energy poverty, in that context, is a term that can be defined in multifarious form that include diverse approach. The width of the term can be elucidated keeping in mind several factors and

indicators, and scholars are yet to come to a definitive conclusion and synergy as to what might be the objective interpretation of the term. The discussion regarding the concept customarily includes the incorporation of the idea of access to energy by people and households. On the other hand the amplitude of this design might include empirical study of both connection to the energy grid (Pachauri and Spreng, 2004, Pachari *et al.*, 2004, Cheng and Urpelainen, 2014), as well as the concept of affordability of this access (Winkler *et al.*, 2011, Alkon *et al.*, 2016). This chapter would try to look into all the possible factors that contribute to understanding and evaluating energy poverty, in the case of India, from a socio-political perspective. The impetus of this chapter is to make an attempt to understand the modalities of

energy poverty in terms of the developing country of India. The pursuit would be to create an episode in the study so as to eventually lead to assimilate the concept of energy poverty within the premise of energy security at the level of domestic policy in the following chapters to come.

Energy Access and Energy Poverty in India:

While negotiating the modalities of access to energy, energy security at the domestic level has always been approached from the perspective of the state, and subsequent infrastructure associated output related debates. Somehow the same debate has been neglected to generate traction from the context of the consumers of energy, that is the people of a country (Balachandra, 2011). Thus to assume that a mere mention of energy access in the development policy of a country without assessing the energy needs of its population is not enough. The linkage between energy and poverty while discerning the modalities of the width of human security, for that matter, has been established in the past few decades by the academia (Bhide and Monroy, 2010).

Energy poverty in most cases is identified with the access of households to modern fuels, which in turn intends to be the unit of discussion in this study. In the same token, on the other hand it must be kept in mind that different households have varied necessities towards sustaining energy security. This has definitive impact on the interpretation of energy poverty. For example, how much a household spends on accessing energy also leads to the rationale behind understanding the method to discern the particularities of the concept. This insight leads to the interpretation in terms of the understanding, for instance, that in some cases the household in all probability, while facing energy poverty, is spending more than it is supposed to in obtaining energy and in the process is having to let go of many other household necessities at the cost of the same. In the same token, when a household spends less in accessing modern fuel, it might also mean that households do not find it viable to spend on modern fuel, even while it is available, which in turn might site the problem again at the affordability factor towards accessing energy (electricity in this case of study) (Alkon *et al.*, 2016). The question in the later case is then what makes access to energy viable or feasible to the consumer, whereby they can both have access to affordable energy besides not having to prioritize this admittance over access to other necessities of

sustenance. In those circumstances, it must be kept in mind that it is not always the increase in energy prices that propels the consumer to disconnect from the power grid. It might very well be so that the price of access to energy has been constant for several years over the time period in question. In that case, a flip-side view to the problem is necessary for analysis to interpret energy gap leading to the problems of energy poverty. Even while the price of accessing energy might not increase when the cost of other necessities in a household increases, the share of expenditure on energy also increases automatically exerting pressure in a household budget, and might prioritize accessing other necessities of the household over energy access (Alkon *et al.*, 2016). Also, it has been perceived that a household might choose to continue to use traditional, non-conventional sources of energy, over access to electricity if the latter is recognized to be expensive in the light of the availability of the former, which in turn might be understood to be inexpensive in comparison, however unsustainable it might seem (Bhide and Monroy, 2010). Thus at the policy level, the task remains with the government to encourage more connection of households with the electricity grid by making it lucrative and seem to be a natural choice over traditional energy options.

The timeline to be studied in this thesis is 2006 to 2015. Also, first and foremost while describing energy poverty, an economic term in academia, the stimulus would be towards looking into the economic considerations that determine the term, or contribute towards determining the term. Total electricity generation in India as per the International Energy Agency from 2006 to 2015 has increased from 773784 gigawatt hours (GWh) to 1383004, nearly doubling in the process (International Energy Agency). However, this study embarks to verify if increase in total electricity generation actually translates into increase in access to energy by households in a country. Factors to look for in that case would be not only to find out if households of the country are connected to the electricity grid that registers such monumental growth in energy production, but also to ascertain if the tariff rates of electricity, as provided to the households, is affordable by the citizens of the country. Whether a household has to spend a considerable amount of its income on accessing electricity is but an important concern to take into consideration in order to determine energy poverty, albeit in the face of significant increase in production of energy in the country. Access to energy

by households is not enumerated merely by connection to the mainstream electricity grid in a country. The UK Department of Trade and Industry (DTI) defines unaffordability of energy by fuel poor households as such if they have to spend more than 10 per cent of its income in energy (Winkler *et al.*, 2011). This might vary keeping in mind the fact of the size of households in question. Further, the amount of energy a household spends also depends on the climatic condition of the household in question. This study thus tries to understand these modalities and their practical applicability in the context of India.

Correlation of Energy Consumption Patterns and Expense in India:

India is the world's third largest producer and fourth largest consumer of electricity as per BP Statistical Review 2017. As per the same report, the energy consumption of India has catapulted by 5.6 per cent in the year 2016 (BP Statistical Review 2017). Yet, Energy expenditure by households in India on the other hand touches the mean of 13.2 per cent as per the 66th National Sample Survey statistics, well above the 10 per cent expenditure cap as specified by scholars by developed countries' levels with the burden of energy cost to be the highest in households with lower income (NSS, 2015) (Alkon *et al.*, 2016). This clearly highlights the energy poverty or rather the energy gap existing in Indian households that need to be delved into. It points out that while India as a growing nation does feature into the global energy map acknowledged by its thriving energy consumption markers, when the focus shifts to the Indian households, the picture changes drastically.

The 68th round of National Sample Survey (NSS) data collected between the years 2011 and 2012, it has been found that even very much to the present about more than half the rural population carry on with the use of wood chips and firewood as their source of energy for cooking. Data collected in 2005 suggests that 364 million of the rural populations in India, out of 809 million lack access to electricity sources (NSS, 2006). The preeminent choice of fuel in these rural households have been cow dung, wood chips and kerosene. As per a study made in 2010, there had been negligible shift of the rural households towards modern and more sustainable sources of energy like oil, or electricity, though it is understood that it is in the rise (Bhide and Monroy, 2010). On the other hand, it is perceived that about 625 million people

continued to use traditional fuel to meet their energy needs (Bhide and Monroy, 2010). This detail does not however articulate if this significant section form a part of only the rural population, or overlap into the growing urban population of the country. If the latter is true, then it must be a matter of escalated concern given it is always perceived that it is the rural population, who are at the receiving end of poverty margins, who feature at the bottom when it comes to energy poverty as well. This widens the scope of energy poverty from being limited to the rural population of the country. Rather, the urban poor, who might be still choosing traditional energy sources over access to more sustainable sources like electricity must also be brought under the ambit of the study.

It is, in fact, interesting to study if the income poor are also energy poor in India. While on the surface economic development of a country is reflected also in increased energy consumption of that country. For example in the period between 2000 to 2007 electricity consumption of India increased by 60 per cent mirroring the 77 per cent growth in the Indian economy (Khandker *et al.*, 2010). As per the 2005 household survey while 22 per cent of households in rural areas in India are income poor, some 57 per cent of them are energy poor. For urban areas on the other hand while 20 per cent of the population are income poor 28 per cent of them appear to be energy poor (Khandker *et al.*, 2010). This challenges the idea that those who are facing economic poverty also face fuel poverty. On the other hand it can be not very far fetched to claim that energy poverty is not always dependent on income status of a household. This widens the understanding of energy poverty as a concept contributing to the understanding that economic development does not always alleviate energy poverty conditions of a country. Also while LPG use has increased in rural India, the major consumption pattern of households suggest that they still depend heavily on Biomass consumption. Thus with increase in income almost invariably energy consumption of a rural household increases over a period of time. However similar is not the case in an urban household. With an increase in income in an urban household it is interesting to observe that there is a transition from the use of traditional fuels to modern mix of energy consumption. This modern fuel is often more expensive than traditional fuel (Khandker *et al.*, 2010).

Also how and for what purpose energy is used varies extensively between rural and urban households. What

determines the choice of a particular energy must be subjected to enquiry in order to understand energy poverty as well (Pachauri and Spreng, 2004). It has been founded by studies that households in India prefer to use a mix of multiple fuels while catering to their energy needs, be there in a rural area or in an urban area (Pachauri and Spreng, 2004). A complete switching from a particular mix of fuel to another source of fuel is in fact rather avoided by households. While rural households predominantly use energy for the purpose of lighting and cooking, energy in urban households is used for various other reasons. Character of energy used also have an important bearing in the purpose for which energy is used in a household especially while understanding the difference between rural and urban households. While kerosene is used predominantly in a rural household for lighting purposes in urban household electricity is majorly used for multiple uses. Even while the use of LPG has increased in rural households, the use of wood chips and cow dung or other biofuel sources is predominant for the purpose of cooking in rural households. On the other hand electricity has an overarching presence in the energy mix of urban household where it is not only used for lighting purposes but also for making available many other modern utilities to an urban household. This is an important dimension to the availability of energy and the character of energy in a rural household and an urban household in India. With less availability of electricity in a rural household the choice of energy is quite limited which is why kerosene seems to be the only option for lighting in such households, in the absence of electricity. It also must be kept in mind that Biomass and biofuels and traditional sources of other fuels have much less efficient than LPG or electricity making the rural households actually spend more fuel in comparison to urban households which are using less electricity to attend similar ends (Khandker *et al.*, 2010). Thus the efficiency of the character of fuel used is essential in understanding energy poverty and its character in different phases of a society from underdevelopment to development as well as in different areas of a society, rural and urban. Hence it can be comfortably deduced that energy poverty rapidly reduces with the increase of the use of modern forms of energy like electricity.

Why a particular mix of fuel is used or a choice of a particular type of fuel is made by a household, can not always be determined unilaterally. Neither can it be deduced that the choice of a particular kind of oil is

determined only through economic factors. As Pachauri and Spreng found out in their study that the choice might be determined on factors of affordability, that is, the cost of the energy service, cultural or social preferences, literacy, while sometimes it might be determined by security concerns relating to the supply of a particular or varied types of resources available (Pachauri and Spreng, 2004). Even while the cost of a fuel is determined by the time and labour involved in collecting the fuel, sometimes households would overlook that and determine their preferences based on the easy availability of the fuel source. For example, wood chips are more readily available in rural areas. The rural population do not generally have to pay a price to collect woods. Even while there is intense labour involved in collecting wood, to use it for fuel purposes, the inexpensive nature of the wood collected act as an incentive to the rural households in terms of preference and use. Similarly, the availability and the cost of possessing a stove to burn the wood is almost negligible, giving the rural population of India, the incentive to use wood as their primary source of energy in households in terms of cooking over any other source which might include higher costs like buying an LPG stove. However, if one adds the labour cost of attaining wood for the same purpose, then the expense incurred in accessing this particular source of energy would be, if not remarkably increase to modern sources of energy like electricity, but at least considerably increase to its earlier status of being inexpensive, at best (Pachauri and Spreng, 2004).

Studies in case of India suggest contrary to examination of similar conditions in other countries, as suggested by scholars (Masera *et al.*, 2000), that the transition from inefficient traditional fuels to more efficient sustainable and modern fuels is not a unidirectional process (Pachauri and Spreng, 2004). Households in India, be it rural or urban, tend to use multiple mix of fuels or energy to meet their energy needs. Fuels like coal thus has been noted to be of transitional character. While the rural population of the country use a greater mix of these transitory fuel, urban population use a lesser fraction of the same in their energy mix (Pachauri and Jiang, 2008). Since the population in the urban areas of India are more dense in character, it is easier to connect them to the central electricity grid. Easier in this context must be taken in terms of being easier in reach to the grid, and thus cheaper in distribution of energy. Rural India, for that matter, is still characterised by a dispersed

population density. This makes it difficult for the central electricity grid to access the households more efficiently. Connecting rural households is more expensive in character thus. Also, the financial capacity in general terms of the population in urban areas is more compared to the rural areas. Which is why it must be understood that they have better spending capacity as well as better option to invest in more expensive modern modes of accessing energy (electricity in this case), than the rural population, which in turn prefers traditional options of accessing fuel (Bhide and Monroy, 2010).

Territory and Regional Disparity Contributing to Energy Poverty in India:

Regional disparities in development also contribute to increasing and invigorating the energy poverty debate. As per a study by Alkon, Harish and Urpelainen in 2016 proves, the burden of expanded energy prices is felt by rural areas more than in urban areas. It has been confirmed by the study that even while energy burden is higher in some state (regions) in India, than in some other regions, even in those cases the burden of energy prices weigh heavier on the rural population of the country more than it is felt by the urban population in the same region (Alkon *et al.*, 2016). The study also points out that even while access to modern fuel options have increased over the time in the case of India, enumerated by say only 31 per cent of the households in the country having connection to the electricity grid in 1987, compared to around 73 per cent of households having access to electricity, the energy cost burden over the rural population of the country has also gone on to increase, thanks to energy inflation over the years (the study spans from 1987 to 2010) (Alkon *et al.*, 2016). The study also points out that the burden of energy cost weighs heavy on certain regions more than on other. States of India that have better wealth index like Tamil Nadu or Kerala have better access to energy than other regions with poorer development index like Bihar and Uttar Pradesh (Alkon *et al.*, 2016). The northern states of India, which had been positively affected by the Green Revolution, like Himachal Pradesh, Uttaranchal and Punjab, face less energy gap especially in the rural areas of the states (Khandker *et al.*, 2010).

The character of the access of people to energy is also affected by the topography of the country. For example, the state of the country which are closer to the coal producing belt of the country, have better access to coal as a fuel source. States like Bihar, and West Bengal

fall in this category. At the same time, the regions of the country which have difficult terrain in terms of, for example, being mountainous or having other varied inhospitable conditions, like the North Eastern part of India, face difficulty in being connected with the central electricity grid of the country. For the latter, for example, the region has been termed to be 'energy starved' (Borah, 2007), even while having a plethora of natural energy resources like, upper riparian, swift river systems; wind power with the potential of about 300 to 500 megawatts of production capacity even at lower heights of 50 to 80 meters (Ministry of New and Renewable Energy Annual Report 2016-2017); also, coal, oil and gas for thermal power generation as well, which remain untapped for several reasons. It is indeed an irony that while this region ranks quite high in the production capability of electricity, while it comes to energy consumption patterns, it has featured pretty low. About 97% of the hydropower potential of North East India is yet to be harnessed (Das, 2013). The paradox also remain in the testimonies that point towards the energy deficit of the region so much so that they have to purchase a lump sum amount of energy from other states (Borah, 2007). About 53 per cent of the population living in the north eastern India do not have access to electricity (Centre for Science and Environment 2016-2017). The situation varies in different states of the region, with Mizoram fairing the best with 84 per cent of the population having access to electricity, while only 37 per cent of Assam on the other hand have access to electricity for lighting (NSS 2011, Centre for Science and Environment 2016-2017).

The topography of the region has been slated to be the main hindrance in both production, generation as well as distribution of energy in the region. Even electrification programmes like the popular Deendayal Upadhyay Gram Jyoti Yojana (DDUGJY) have only partially solved the problem as of yet. The rate of Electrification of the states of Northeast India is considerably lower than the national average of about 84.3 per cent (Das, 2013). Shocking figures like electrification of less than 500 villages in about 4 states of Manipur, Mizoram, Nagaland, Tripura can only prove the extent of difficulty of the situation at hand for the Indian government at the policy level. There are success stories from sections of the region like Arunachal having the largest share of about 40 per cent of its electricity source being garnered from renewable sources, and 38 per cent from hydropower sources, even while about only 66 per cent of the population of the state being

connected to electricity (NSS 2011, CEA Executive Summary, 2016) making it about 30000 people having no access to electricity; Meghalaya having 70 per cent of its population receiving electricity from Hydroelectric power sources. The situation is worse in states like Assam which have the highest density of population among all the other states of the northeast India with heavy dependence on fossil fuels. Manipur on the other hand shows a transitory character, where 33 per cent of the population use gas as their primary source of fuel and 39 per cent of the population drawing its electricity from hydroelectric sources (CEA Executive Summary, 2016).

Access in general to the region of northeast India has been problematized by the topography of the region which poses a serious problem for the Indian government as well. Scholars believe connectivity to this region have been cut off by the partition of India with major Railway links running through Bangladesh (Das, 2013). The population residing in this region face serious problems in terms of connectivity even now and are underdeveloped in several other terms, like poor infrastructure, also for the same reason. This region is characterized by torrential monsoon followed by floods and landslides. Also the region is categorised to be one of the most active seismic regions of the world (Das, 2013). Further 60% of the geographical area of North East is under forest cover which is rich in biodiversity. This becomes an important consideration while making decisions for big installations towards generation of electricity in this region, like construction of dams for example. Disputes emanating from water sharing between India and its neighbouring countries also pose a serious problem in installation of dams over rivers which are shared by other neighbouring countries of India as well (Das, 2013). Connectivity of the region to the central electricity grid is also a problem given the construction of connectivity lines over a considerable distance, especially through a small land corridor that connects this region with the rest of India, making the process more expensive than it would be for any other part of India. These reasons compositely make up for enough reason to pose serious concerns towards both the development of the renewable energy potential of India, as well as in general connecting the region to the central electricity grid of the country.

While statistics prove that there is some obvious reduction in the situation at present, even then around 240 million people in India lack access to clean and sustainable energy (Hunink, 2017). Around 86 per cent

of rural population and 20 per cent of the urban households still rely on solid Biomass as primary source of energy (Jewitt and Raman, 2017). This is where the catch lies, while studies (Alkon *et al.*, 2016) might reveal that the correlation between a household spending on energy has been stable over three decades from the 1980s to 2010s, the idea that universal access to electricity and other sources of modern energy, even while involving the private sector in the distribution of electricity is erring in ways more than one. This is where the hook to identify energy poverty lies in the context of India. Also, this study believes that since as proposed by Alkon et al in their study that households, rural included would be more willing to pay higher expenses on energy if they have access to the electricity grid or have access to modern fuels, to begin with appear flawed. This approach dilutes the case of affordability of energy access, in turn mitigate the circumstance to objectively identify the nuances of gathering the scope of energy poverty in the case of developing countries like India. This study considers access to modern fuel options in the form of connection to the electricity grid as well as the price which a household must consider to let go of to access it. In this thesis, in subsequent chapters, it would be clearer how policy initiatives at the level of the government of India has till now sought to review and remedy this issue as well as how far it has succeeded in the same.

It can be said with utmost certainty that the government of India does not, at present, at any cost, ignore to identify the necessity access to energy inserts on the development of the country and its populations in general. Several energy related policy level discussions as well as interventions have made it amply clear that the intention of the political elite of the country is definitely towards mitigating the problem of the gaping energy gap amidst the population of the country. There has been a significant shift in the outlook at the policy level to consider energy from not only the perspective of consumption, but also envision it from the mindset of being 'need-oriented' (Jewitt and Raman, 2017). Prayas Energy Group, an NGO based in the city of Pune, India, annually has done a systematic study of the electricity legislations of the country that might give a thoughtful insight into the mechanisms with which electricity is distributed in the country and the problems, if all with the process. The technicality of the process, essentially a top down approach, given the context of the distribution of energy from the producer to the consumer, shall be dealt with in

detail in the 4th chapter of the thesis. However, in this chapter, just to provide a context to the scenario that contributes to energy poverty, it must be a decisive task to look into some excerpts of the same.

The Subsidy Regime and Cost of Power:

Subsidy to the energy sector to make energy accessible to the poorest of the population has been a historical tradition of the Indian government. In Modern times, subsidies is also provided to transition fuel to make the population susceptible towards evolution from traditional fuel practices to modern energy mix (Cecelski, 2000). The energy sector in India in general, and the electricity disbursement sector of the country in particular is largely a public sector, where the involvement of the government plays an important role in mitigating the heavy costs in the production of electricity, while distributing the same to the consumers, via control of tariff rates, issuance of subsidies to consumers to help them choose more sustainable sources of the same over traditional, inefficient ones, and incurrence of surcharges to the DISCOMs doing the distribution on behalf of the government authorities. In more recent times, the surcharging of the DISCOMs have been undertaken under the directive of the Financial Restructuring Plan (FRP) of 2012, the Ujjwal Discom Assurance Yojana (UDAY) of 2015 and the 2016 Amendment of the National Tariff Policy (Josey *et al.*, 2017). It has been found that in Indian states, DISCOMs have been compelled to a significant amount of uncontrollable extra costs involved in distribution of electricity, be it for the reason of change (read raise) in primary fuel prices, raise in price of transportation of the fuel, change in the rates of taxes, etc, through increase in tariff rates by 7 to 25 per cent from the consumers of electricity (Josey *et al.*, 2017). This phenomena persists in the majority of states in the country, whereby the cost over and above distribution of electricity is gathered from the customers annually, which they often have to pay retrospectively. Surcharge is revised in India typically on a quarterly basis, even while it is levied on the electricity of the consumer on a monthly basis. The main problem with the levying of such massive surcharge has not only definitely everything to do with the massive disparity between what the consumer was supposed to pay as rate of accessing electricity at the beginning of the term but also with respect to how much transparency is undertaken while determining and applying these surcharges with almost

negligent involvement of the consumer, that is the public in the process of determination of these price (Josey *et al.*, 2017). There is an urgent need to increase credibility of the electricity authorities and the intention of the government of the country and the states of the country to be particular, through more transparent national legislation for the same purpose. The state electricity regulatory bodies must show this intent through processes that increase the participation of the public, as well as include those costs in the surcharge that is absolutely unavoidable and encourage the government to step up with financial respites to the consumers wherever possible. These can be done through measures like letting go of the costs like penalties for deferred payment of charges, which is already in practice in some states of the country like Andhra Pradesh and Bihar; keeping in mind the fuel subsidy given to the poor households and customers, for the consumers to pay included in the surcharge (Josey *et al.*, 2017).

Problems in governing the distributing companies (DISCOMs) that distribute power to Indian households, especially in the rural areas are complicated. The interaction between these DISCOMs are often guided by extra-governmental manners. It must be kept in mind that these DISCOMs are in most cases private entities with profit motives of their own, encouraged to participate in the distribution of electricity by subsidies provided by the state governments that they operate under. Often interaction between two or more DISCOMs are governed by economic rivalry, market considerations, or strained relations based on the states they perform on behalf of. Telangana for example is a state that has been newly formed in India, breaking up Andhra Pradesh. The two states since have had strained relationship with each other, whereby, the DISCOMs under them, even while they have opportunities to collaborate, resulting into financial respite to the customers of power, in the form of tariff relief, has often chosen to ignore that. In the time period of 2017-18, power sharing between Andhra Pradesh DISCOMs to Telangana DISCOMs have seen certain disruptions. Similarly, even with the availability of surplus power, they have refused to purchase the same from each other in cheaper rates, even while it has led the DISCOMs with the need for surplus power to acquire the same from other DISCOMs at higher rates established by the market (Rao, 2017).

These problems contribute to the increase in the cost of power, leading to complications in both

affordability as well as accessibility of electricity to the consumers of the country. Regulation of tariff rates for the government of this country is rather delegated to the state authorities of the country. Even while there are national central regulatory boards for determining the cost of fuel, for example to generate electricity, the ultimate determination of cost of electricity is done by the state electricity boards or commissions of the country. While it is majorly the forte of the central government of India to make energy installations across the country, connect towns, cities and villages to the electricity grid, it is the responsibility of the state authorities to decide the tariff rates of distribution of electricity and power. That might have several positive features, however, decentralisation does have some very practical problems as well, especially while it contributes to the tariff rates of electricity. Firstly, it is the state governments which enters into interactions with private entities to run DISCOMs at the state level. It is their responsibility to regulate the performance of these DISCOMs, determining what is going to be the cost of power to be incurred by the consumers, and their households. While the price of fuel remains the same across the country, the fee for transportation of the same from one part of the country to another differ, based on the location of the countries. This is one major reason of differences in the price of electricity across states in the country. There are states which do not produce energy of its own. These states have to import energy from other states to satiate their energy needs. However, the farthest the state that they import their energy from, the larger would be the cost of inculcation of energy to its consumers (Sudeep, 2017). This is an inbuilt fallacy of the energy sector of the country. Further, there are private power producing entities in some cities that enjoy almost monopoly over the electricity consumption markets of the cities, due to the lack of any other competition in the market. A case must be cited for the state of West Bengal, where CESC, the Calcutta Electric Supply Corporation, a private electricity generating and distributing entity run by the RPG Group enjoys almost unchallenged monopoly of the market of the state since the 1970s over Kolkata. This has led to a somewhat unhealthy, unhindered process of unquestioned increase in the tariff rates of electricity distributed in the city, whereby even while West Bengal falling in the traditional energy rich, coal producing belt of the country, has seen rapid increase in per unit cost of electricity being dispersed to the households. Moreover

the West Bengal Electricity Regulatory Commission has given undue advantage to the licensees of power supply by giving them 0.25 per cent of their gross assets as exigencies or difficulties unforeseen, making the consumers pay charges to access electricity that they are not supposed to pay in the first place (Choudhury, 2017). There is thus huge disparity in the tariff rates of power given to households of different states of the country.

Can Decentralisation be the Answer?:

Decentralization of energy distribution, that is providing access to the population of the country has time and again been proclaimed to be solved by connection to microgrid operations. Most of these solutions are in fact provided by private energy providers. However, what needs to be kept in mind is the fact that these microgrid operators are private entities that administer this energy access, especially to areas which are remotely located and rural in character. The situation is such that these microgrid operations, since providing energy to a section of the population with not very high spending capacity, despite being run by private operators, consequently are loss making (Hunink, 2017). Thus there is no incentive to private entities to enter in energy distribution process. The argument that there needs to be more decentralization in energy distribution, in terms of privatizing a section of the sector, fails to stand. This thesis would deal in detail with political interventions at the level of the government to deal with increasing energy access abbreviating energy poverty of India in a following chapter. The possible respite lies on more reasonable and sustainable tactics introduced by the public sector in the domestic energy policy of the country.

This study tries to argue that at the policy level the push must be devised to build a sustainable apparatus which encourages larger participation of the community that is to be integrated into the grid, be it through off-grid strategies, through means that do not further discourage them from this connectivity. The line of reasoning that tries to push private sector involvement in the energy sector essentially look at it from the perspective of it being a market, that essentially needs to be monetised in order to be viable in the first place. That argument fails to address the concerns of the people and the households that the process would be further alienating towards the citizens and fails to sync the idea of energy security with energy poverty, a study from the perspective of the

citizens. The involvement of private concerns ignoring the inevitable rise of price of energy, manifesting through higher tariff rates than the contemporary shall only do a disservice to the very point of access to energy that 'consumers' are intending towards, rather than addressing energy poverty concerns, substantially because private entities are typically propelled through profit making motives, even at the cost of any other viable concerns that might arise. This chapter in that case has already argued that the tariff rates of access to energy is of great repercussions on the debate around energy poverty. This is essentially because the affordability factor of the debate cannot be alienated from energy poverty. Energy poverty cannot be understood if access to energy is viewed in isolation and not in combination with affordability of energy in concern.

The Classification of Society and Access to Energy:

Even while economic terms essentially cannot be ignored while formulating the definition of energy poverty and demarcating its modalities, one cannot ignore social factors like class, gender and especially caste in the context of India, that donate to its definition. This is where the capabilities framework come in handy in understanding the nuances of the debate of the issue. It must be noted that the size of a household, gender of the head of the household, age of the head of the household who makes energy practices and choices, also determine and have considerable bearing on the energy choice of the particular household as well as energy poverty experience of the household (Alkon *et al.*, 2016). While one tries to analyse energy poverty through the perspective of capabilities framework, it is essential to understand that energy, in such regards, must be viewed from the perspective of a service that is incidental in contributing to human freedom, expressed in terms of contributing to human productivity reflected through labour, healthcare, job creation etc (Mahat undated).

In terms of gendered perspective over the access to electricity, there is a considerable unavailability of sources to study in the matter. It would be only an educated understanding that gender of a consumer has considerable impact on the decision made by the household. The way a male head of a household decides on allocation of budget to access various resources for the sustenance of household might in all probability differ from the way a female head of a similar household would. Poor households often have a gender character to it that

is often, on the other hand, either ignored or isolated, and to some extent, even invisibilized. There is the existence of a large number of households in developing countries that are headed by female (Cecelski, 2000). Their position as the head of the family makes it essential for them to appropriate energy as well as manage the distribution of energy within the household. There is however great ambiguity in ascertaining that detail most of the facts and data available on household expenditure on energy, for that matter, as well, especially when the study is on determining energy poverty, based on gender preferences. While applying the capabilities approach to the study, it is only pertaining that gender nuances are also kept in mind while determining capability of a household which might have definitive impact on energy poverty of a household in particular and the country in projection.

Many studies have deduced that rural electrification in many cases have benefited the higher income populations than the lower income ones (Barnes, 1988, Cecelski, 2000). In the same token can it be concluded that every developmental project faces the same pitfall. In other words the social differences between sections of populations in a society has its bearing on how development is accessed by these different sections. In the same token, While taking a gender perspective to energy poverty, considering energy to be definitive marker of development, the question remains if it can be proved similarly that a gender which has been discriminated historically, also face similar discrimination when accessing affordable and sustainable sources of energy. There is however a lack of empirical study which has taken objective position on understanding this phenomenon in detail. It is a given that India is a country which has divisions in the society based on several discriminatory practices, be in gender, class or caste. If it is proven that economic disparity has been the basis of denying access to energy, be it in the forms of restricting access to electrification, there can be no reason why access to affordable energy might also be restricted based on other social forms of discrimination as well. Poverty faced by a man and poverty faced by women are different in nature and character. Men and women for example do not have access to similar credit facilities (Cecelski, 2000). Similarly men and women in a society are not perceived similarly, in a developing country especially, like India. In traditional society is like India for example cooking is still a practice which is predominantly performed by women in the household. It is already thus understood clearly how

hazards from using biofuels affect women more directly than men in a household. Similarly their social access is dissimilar and discriminatory in fashion. Ignoring such perspectives in understanding poverty and energy poverty, for that matter, contributes to the overlooking of effective means of making energy access compelling to the distressed sections of the population, diluting the very essence of the concept. Thus there should be a gender perspective in policy formulation which caters to energy distribution among the masses, including the pricing of energy. There is the need to incorporate gender as an important determinant while designing energy project and based on that, what field methods and analytical tools must be used should be determined (Cecelski, 2000). Rural electrification, thus, from the perspective of a more nuanced gender viewpoint, must take into consideration several factors, like whether electricity would be successful in reducing labour of a woman in collection of water by energizing water pumping, whether electricity would reduce the time spent in cooking, reduce her time spent on agriculture or agricultural activities, reduce labour and increase her leisure activities, in the process considerably increasing her productivity, and subsequently her capability (Cecelski, 2000).

There is thus a very urgent need to bring in a change in the rural electrification program or for that matter any energy policy of the country, both at the national level as well as at the state level. Though India has tried to do its best in terms of increasing the number of villages connected to the electricity grid, the problem remains as to how many times this connectivity of villages have transformed into connectivity of each and every household of the village in the electricity grid. Further, the voltages of power supply has proved to be faulty in most cases. Even while number of villages connected to the grid has considerably increased in the past decade or so, the voltage of power supply has continued to dwindle. There is serious concern regarding the variation in the rates at which electricity is distributed across the states of India. Depending on where the household of a consumer is located, the tariff rates vary heavily. Further, these tariff rate imposition has been time and again questioned depending on the transparency of the entire mechanism of its performance. The increase in power tariffs in many states are despite the prevalence of technical problems of maintenance of power distribution mechanisms in the country in general and the states in particular, reflected through defective meters, non

replacement of either faulty or non-performing transformers, low voltage of the power supply, etc.

Conclusion:

Energy poverty, thus, in the case of India is not a mere matter of the availability of power, electricity or fuel for that matter, but also the charge at which energy is made available in the country to its households. There is a systematic lack of uniform mechanisms to make the determining factors of energy poverty go away. This is because of several factors. While the possibilities of generation of electricity through renewable channels bring forth a promise to the future of India's energy sector, there are still considerable roadblocks to deliberate on, regarding the same. India does not lack behind in the production capacity of renewables. The mere expanse of the country, differential topography, climate, and also political exigencies need to be considered to make the issue at hand possible with regards to renewables more viable to the country. Rigid bureaucratic mechanisms to deal with technical problems like replacement of transformers for existing electricity grids itself complicate the matter. Often the Indian Electricity Act of 2003 has been heralded by scholars to be a mechanism through which there has been thorough encouragement of privatisation of the sector in the country, as a consequence to which private, profit making entities have functioned through unregulated hike in electricity tariffs diluting government's control of the sector (Choudhury, 2017).

If there is a lack of seriousness in maintaining the order of the already established electricity programme, what can be expected to be accountability and transparency at which power shall be encouraged to be dispersed through renewable sources gather serious doubts. Open access mechanisms on the other hand, whereby private participation in the production and distribution of energy on the other hand does more negative than positive to the energy poverty scenario of the country. Energy poverty in case of India thus is a scenario that is multifarious. There are several factors that need to be kept in mind while calculating the probabilities and modalities of the concept. It is neither unidimensional, nor thus can the approach to the solution of the problem be provided in a peripheral manner. There has to be a thorough intake of all the problems of the situation from the grassroots level to the national level. It must be kept in mind that the problems of bureaucracy contribute to energy poverty as much as surge in tariff

rates of the end product. Adjustment and regulation has to be brought in at every level to counter the reality of energy poverty in India.

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