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# Where Women Stand in Rural Electrification Efforts: An Exploratory Study within Gujarat

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Where Women Stand in Rural Electrification Efforts:  
An Exploratory Study within Gujarat

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School for International Training India: Sustainable Development and Social Change Program

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## Abstract

*Since its 2003 village electrification scheme, the state of Gujarat has been acclaimed for providing rural households with 24-hour access and farmers with uninterrupted 8-hour power supply. The Government of India has emphasized goals of providing electricity for all of its citizens yet has been unable to address glaring discrepancies across the country. For those in rural areas, which is approximately 60-70 percent of India's population, a varying degree of connection exists plagued by frequent outages, transmission losses, unreliable billing practices, and poor infrastructure maintenance. Gujarat has been reported to have overcome these obstacles with its bifurcation of electricity feeders, providing quality electricity access to 100 percent of its villages in just a few years.*

*With the focus of these rural electrification efforts to increase the number of people with access, this paper looks to understand what it means for the women of these households to gain access. Amongst recipients, women are expected to benefit greatly as the primary bearers of household drudgery and work. Through the Gujarat-based rural women's empowerment organization ANANDI, this study utilized both qualitative and quantitative interviews and surveys to understand how rural women from the Sihor and Umralla blocks of Gujarat engage with electrification and to what extent they perceive its impacts. In doing so, this study is not representative of all rural women yet it provides initial insight into how electricity represents a critical element of their day-to-day lives while traditional power hierarchies remain prevalent even in electricity usage.*

## Introduction

Electricity has pervaded our world today by transforming our way of life and being the fundamental piece to innovation in the 21<sup>st</sup> century. It presents a pivotal connection point and brings new possibilities with every clicked button and flipped switch. Electricity enables many changes such as longer working hours, greater efficiency in daily tasks, and more accessible information that has been shown to correlate to several positive development outcomes including increased income, improved health, and greater educational attainment.<sup>1</sup> However, there are still billions of people lacking access to electricity, particularly in the rural areas of developing countries. According to the International Energy Agency, in 2013 an estimated 1.2 billion people did not have access to electricity. The overwhelming majority of those living without electricity are in countries in sub-Saharan Africa and developing Asia, predominantly in rural areas.<sup>2</sup> Despite the continuous push for more people to gain access to electricity, such access in urban areas far outpaces that of rural areas both in number and in quality.

### *India's Pursuit of Universal Electricity Access*

With aims for continued growth, India has shown a long-standing commitment to expanding electricity access.<sup>3</sup> Between 2001 and 2005, the Government of India set up six major schemes for its rural areas to gain electricity access. Unfortunately, this large focus on

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<sup>1</sup> Mathur, Jaskiran Kaur, and Dhiraj Mathur. "Dark Homes and Smoky Hearths: Rural Electrification and Women." *Economic and Political Weekly* 40, no. 7 (February 12, 2005): 638-43; Bilolikar, Rajkiran, and Ravi Deshmukh. *Rural Electrification in India – an Overview*. National Power Training Institute, Faridabad; Prayas Energy Group, Pune, comp. *Proceedings of Report of the Round Table on Gender and Electricity, India*, New Delhi. September 26, 2014; Priddle, Robert, ed. *India Energy Outlook*. International Energy Agency. 2015; Banerjee, Sudeshna Ghosh, Douglas Barnes, Bipul Singh, Kristy Mayer, and Hussain Samad. 2015. *Power for All: Electricity Access Challenge in India*. World Bank Studies.

<sup>2</sup> Priddle, Robert, ed. *India Energy Outlook*. International Energy Agency. 2015.

<sup>3</sup> See Appendix 1 for a timeline of India's primary electrification programs

electrifying rural areas represents the great difficulty it has posed to the individual states. According to World Bank data, 93 percent of those living in India without electricity access reside in rural areas. “Among the 289 million rural residents without access, 70 percent are in the lowest 40 percent income groups.”<sup>4</sup> Electricity provision in rural India suffers from a lack of monetary incentive. Since the industry largely privatized post-India’s privatization shift, utility companies depend upon financial procurements and are not eager to make the sizable initial investment along with maintenance of electricity lines given the low source of revenue one can gain from rural consumers. Regardless of government provisions, the data illuminates the glaring disparity in electricity access, and the pervasive lack of incentive to extend the service to rural areas and the rural poor.

### *Gujarat’s Electrification Story*

With these obstacles, growing attention is put on the number of villages being electrified with some states reporting 100 percent electrification. Over the last decade or so, Gujarat has been hailed for not only extending electricity access to its rural areas, but also providing a greater amount of continuous quality power supply than most states.<sup>5</sup> For Gujarat’s development, officials have focused on making it the industrial hub it is today. Attracting industry largely depended on building quality electricity networks that would provide the capacity and reliability companies need. However, with 62 percent of their population living in rural areas, and 52 percent of the total workforce dependent on agriculture for their livelihoods,<sup>6</sup> finding ways to

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<sup>4</sup> Banerjee, Sudeshna Ghosh, Douglas Barnes, Bipul Singh, Kristy Mayer, and Hussain Samad. 2015. Power for All: Electricity Access Challenge in India. World Bank Studies.

<sup>5</sup> "Power Distribution Reforms in Gujarat." October 2009. Accessed March 12, 2016.

[http://www.academia.edu/15595989/Power\\_distribution\\_reforms\\_in\\_Gujarat\\_Power\\_distribution\\_reforms\\_in\\_Gujarat](http://www.academia.edu/15595989/Power_distribution_reforms_in_Gujarat_Power_distribution_reforms_in_Gujarat).

<sup>6</sup> Mishra, Pramod K. “ALLEVIATING ENERGY POVERTY THROUGH INNOVATION: THE CASE OF JYOTIGRAM YOJANA (RURAL LIGHTING SCHEME) OF GUJARAT.” India Energy Congress 2015 (2015).

provide access to electricity for these areas were critical for them to fit into the industrial trajectory of Gujarat. “In fact, till 2003 power supply to villages was for a limited number of hours ranging from 8 to 12 hours, in some cases even less.”<sup>7</sup> Before 2003, Gujarat’s electricity supply operated where all electricity activities (agricultural, residential, industrial and commercial) ran through a common feeder. In the same year as the central government’s Electricity Act of 2003, the government of Gujarat introduced the Jyotigram Yojana Scheme (JGY) to instigate rural lighting for all households. The JGY bifurcated the feeders so that electricity needed for agriculture ran through a separate feeder than that needed for non-agriculture uses. By 2006, over 90 percent of Gujarat’s 18,000 villages were covered under the JGY.<sup>8</sup> Termed their flagship energy program, the JGY has been celebrated for providing agricultural activities with eight uninterrupted hours supply per day and 24/7 power supply for non-agricultural uses.<sup>9</sup>

### *The Lens of Evaluation*

Studies have assessed the impact of JGY on the rural villages in which electricity had been introduced. Improvements were found in more households consuming electricity, overall transmission and distribution losses having declined, and the duration of electricity having increased.<sup>10</sup> The main focus of evaluations has been to document how many are connected and

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<sup>7</sup> Mishra, Pramod K. “ALLEVIATING ENERGY POVERTY THROUGH INNOVATION: THE CASE OF JYOTIGRAM YOJANA (RURAL LIGHTING SCHEME) OF GUJARAT.” India Energy Congress 2015 (2015).

<sup>8</sup> “Power Distribution Reforms in Gujarat.” October 2009. Accessed March 12, 2016.

[http://www.academia.edu/15595989/Power\\_distribution\\_reforms\\_in\\_Gujarat\\_Power\\_distribution\\_reforms\\_in\\_Gujarat](http://www.academia.edu/15595989/Power_distribution_reforms_in_Gujarat_Power_distribution_reforms_in_Gujarat); Shah, Tushaar, and Shilp Verma. “Co-Management of Electricity and Groundwater: An Assessment of Gujarats Jyotirgram Scheme.” Economic and Political Weekly 43, no. 7 (February 16, 2008): 59-66.

<sup>9</sup> Mishra, Pramod K. “ALLEVIATING ENERGY POVERTY THROUGH INNOVATION: THE CASE OF JYOTIGRAM YOJANA (RURAL LIGHTING SCHEME) OF GUJARAT.” India Energy Congress 2015 (2015).

<sup>10</sup> Mishra, Pramod K. “ALLEVIATING ENERGY POVERTY THROUGH INNOVATION: THE CASE OF JYOTIGRAM YOJANA (RURAL LIGHTING SCHEME) OF GUJARAT.” India Energy Congress 2015 (2015).



at what standard they receive access. The way in which rural households have been impacted through women specifically has been seldom inspected in reference to the impact these reforms have had on rural wellbeing. The importance of women in development is widespread and well-established, necessitating such a focus. Prayas Energy Group's roundtable on Gender and Energy with top thinkers on this subject in India specifically addresses the need to study Gujarat as a successful case of recent village electrification.<sup>11</sup>

### *Social Background of the Study Area*

Within the Saurashtra region of Gujarat, the women within this study come from the Sihor and Umralla blocks within the Bhavnagar district. In both districts, women represent 48-50 percent of the population, yet comprise 60-62 percent of the illiterate population<sup>12</sup>. Additionally, out of the total working population, according to the 2011 Census, women only make up 12-13 percent. More qualitatively, ANANDI conducted a 2011 research study and published on the status of women in these societies. ANANDI describes Saurashtra as a region that remains strongly embedded in caste relations and feudal culture, which has kept the position of women in society largely the same despite the changes through social, economic, and political spheres. Women are largely responsible for household work, mainly collecting water and fuel, as well as often working in the fields for wages. Despite all of this work, women rarely have their own form of disposable income and often times have their wages paid to their husband. With it uncommon for women and girls to attain schooling, women are also rarely involved in deciding

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<sup>11</sup> Prayas Energy Group, Pune, comp. Proceedings of Report of the Round Table on Gender and Electricity, India, New Delhi. September 26, 2014.

<sup>12</sup> "Population Enumeration Data." Government of India 2011 Census. April 2011.

matters of the land and home. Without a place for women to speak for themselves in any part of society, they are often left unheard.

### *Research Questions and Objectives*

With this state of affairs, the notions of electricity being able to provide benefits for women in the household are tested. Will it even matter for these women who are disempowered so prevalently in other ways? Now that the 2015 Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) Scheme is to follow Gujarat's reforms, it is worthwhile to understand the state of JGY over a decade later and its specific implications for women. This study aims to understand the development paradigms of rural electrification through the case study of Gujarat after its landmark reforms, evaluating household wellbeing through a women-specific lens in order to understand the social impacts for those most often marginalized and left out of development programs.

### Methods

This study was undertaken in collaboration with ANANDI, a women's empowerment organization based in Ahmedabad, and its partner organization Mahila Swaraj Munch (MSM) that operates on the ground in Bhavnagar. For the present study, villages from Gujarat's Western Saurashtra region in Bhavnagar blocks of Sihor and Umralla were identified due to MSM's connections in these areas which made the study feasible. Since this study is interested in the impacts felt by rural women, only women above the age of 18 were included in our population of interest. As the aim of this study is to understand the relationship between rural women and

electricity provision, a combination of interviews and surveys<sup>13</sup> were used for a qualitative and quantitative inspection as to the way in which women see these reforms impacting their lives. Those surveyed were the female head of the household, taking only one person per household. 15-16 women per district were interviewed for a total of 31 women surveyed across 13 villages. On the basis of my local partner's ability, eight villages were surveyed in the Sihor District while five were surveyed in Umralla. The sampling frame was drawn from the contacts of MSM but women were also approached for interviews due to availability once we were in the village. All women were individually contacted through the phone or in person to explain the study and ask for their consent for their participation. All collection of information was conducted in-person by me verbally through a translator. Women were only contacted and visited once for the interview, which was typically conducted in their homes. Data collection was done over a two-week period.

The sampling design was largely based on feasibility in regards to their local contacts as well as those available in the area at the time we were in the village. Ultimately, these methods have distinct limitations and do not provide a truly comprehensive look into the experiences of all women throughout these villages. These methods do not provide a scientific basis on which to analyze the findings due to a lack of scientific approach to sampling. Despite this, for the purpose of an exploratory study over a limited time span, these methods proved the most efficient for meeting with the most amount of women in the time available. To gain context on the views from other stakeholders in the area, two interviews were taken from local government officials and a Jyotigram engineer.

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<sup>13</sup> The survey can be seen in Appendix 3

All involved were included conditional on receiving informed consent, as well as provided the ability to exit at any time. Additionally, all information was collected and preserved anonymously, with no ability to tie any particular person to that interview/survey. This was a minimal risk, exempt review study, and does not involve any additional risk outside of a person's day-to-day life.

It is important to acknowledge limitations to the data and analysis. The most obvious and important limitation to this research is the language barrier. None of the villagers I spoke with throughout data collection spoke English. All communication was done through a local translator hired to work with me. Unfortunately with any translation, certain thoughts and ideas can get lost in the process. A second limitation which had a large effect on the data collected, was the availability of a translator. This research is not possible without a translator and unfortunately the original two weeks I planned to collect data in Sihor and Umralla was not realistic. Local college students were dealing with exams and could not commit the time necessary for my study. More professional translators in the area were not able to work at the rate I was able to pay due to my humble student stipend. Unfortunately, when a translator was found, this left only one week to collect and resulted in the mindset of trying to cover as many interviews as we could in the days we had. More relating to the translation process, my translator was a male English teacher at a local school which brings subtle yet unavoidable cultural limitations. With the presence of a man, the women may have been more reserved in their answers and felt less comfortable voicing opinions on their quality of life than if the space had been all women.

## Findings

### *Household Information*

The interviews began by gathering basic household information to subsequently contextualize their electricity usage across the sample. Among the various social groups, eight women self-identified as a part of Scheduled Castes, thirteen as Other Backward Classes (OBC), seven as coming from the General Class, and three as Others. The average household had six to seven people, with a generally even distribution among the different age groups and genders. The majority of households were self-employed in agriculture or as agricultural laborers, nine participants in each of these categories. Those self-employed in non-agriculture were close after with seven respondent households.

<i>Social Group</i>	<i>Number of Respondents</i>	<i>Primary Household Occupation</i>	<i>Number of Respondents</i>
<b>Scheduled Caste</b>	8	<b>Self-employed in agriculture</b>	9
<b>Other Backward Classes (OBC)</b>	13	<b>Agricultural Laborers</b>	9
<b>General Class</b>	7	<b>Self-employed in non-agriculture</b>	7
<b>Others</b>	3	<b>Non-agricultural Laborers</b>	4
		<b>Others</b>	2

*Table 1: Demographics of Respondents*

### *Household Connectivity*

Respondents were then asked to describe the extent of their connectivity access. Participants in this study all said that their area has had electricity access for last 30-40 years, some with a fair amount of uncertainty on how many years ago, but with the same conviction that there had been grid connectivity since long before JGY. In addition, all have connection

through the Jyotigram feeders and stated that their connectivity considerably improved after JGY was introduced. Before JGY, various cutoffs and the instability of their connection prevented them from using electricity to a great extent.

Of the 31 participants, 30 had a domestic electricity connection. Figure 1 noted below shows the distribution of how respondents would describe the reliability of their electricity connection in reference to when they want to use electricity. Their options were, “I always have electricity connection when I want it,” “I sometimes have electricity connection when I want it,” or “I rarely have electricity connection when I want it.” The majority reported that they “always have electricity when they want it” while just over one-fourth of respondents stated that they have some trouble accessing electricity when they want it. All of those who said they “rarely” have electricity access when they want to use it came from the Dhamnaka village of Umralla.

In terms of power outages, just more than half of the respondents reported that they have 24/7 connection without any cuts or irregularities. Figure 2 shows the remaining breakdown where eight reported that Friday contains outages that for some of them last the entire day while for others last 0-4 hours. Some of these cutoffs come with notices from the electricity board announcing their occurrence while others do not, and most respondents indicated that they know they have cuts on Fridays but it comes without regularity of the time of day. All respondents noted that with monsoon season comes greater electricity disturbances, often with no power for

days at a time. When asked what they do when there is a blackout, they all reported that they use kerosene lamps for light.

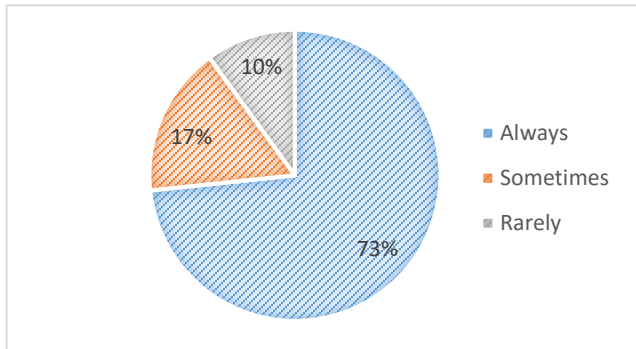


Figure 1: When you want to use electricity, is it available to you?

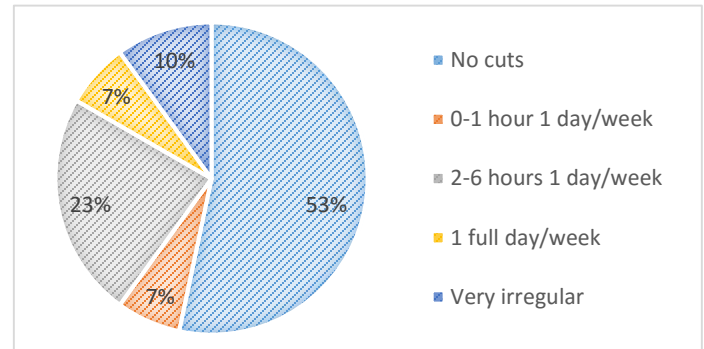


Figure 2: Consistency of Supply

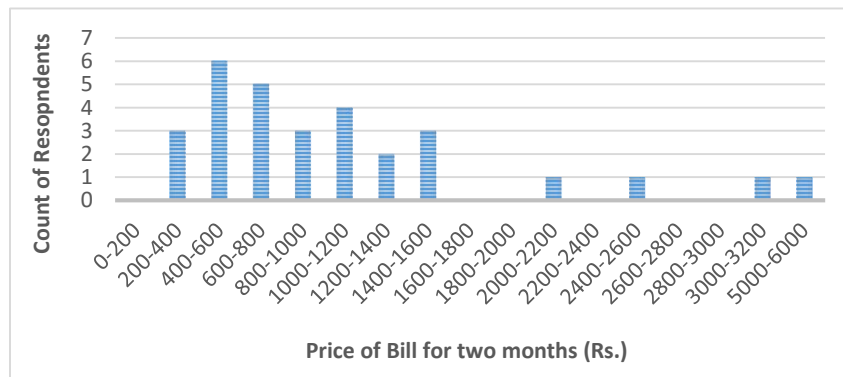
### *Agricultural Connectivity*

Agriculturally, most of the households who are self-employed in agriculture report eight hours of continuous power supply, alternating week-to-week between daytime power and nighttime power. Out of the 31 participants, ten are households self-employed in agriculture. Nine out of these ten have agricultural electricity connections, whereas one is awaiting a response to their application for connection submitted one year ago. Of the nine with an agricultural electric connection, most have the promised eight-hours-a-day of connection throughout the week. Only two had different experiences, both from different villages in the separate districts. One has seven-hours-a-day of connection while the other has eight hours a day, yet only has supply for four days out of the week. It should be noted that when asked about the specifics of agricultural connectivity and electricity billing, nearly all of the women at first commented that they were not fully aware of the situation in that realm and either referred to their husbands for a response or took an approximation based on their knowledge.

*The Financial Side*

The majority of households, 73 percent, reported that they had no problem paying their electricity bills regularly. Of the other 17 percent who said that they had difficulties paying their bill, they stated the need to take out loans, mortgage their own jewelry, or simply have their connection cut multiple times in a year when they could not get the necessary money. Of the 30 households with a domestic electricity connection, one is connected illegally to another’s line due to the inability to pay the electric bills when they had their own connection. All respondents commented on how their electricity use is seasonal and thus billing fluctuates throughout the year, with summers and times of intense heat producing the larger bills which lead families to find ways to reduce their consumption such as sleeping outside at night.

Households were asked to show their electricity bill if they were able to, which twenty were able to provide while the other ten reported the quantity verbally. These numbers are from the most recent bill they received for the months of March-April, with a few deviations. Most households were charged within the range of 200-1600 Rs.



*Figure 3: Most Recent Electric Bill Pricing*

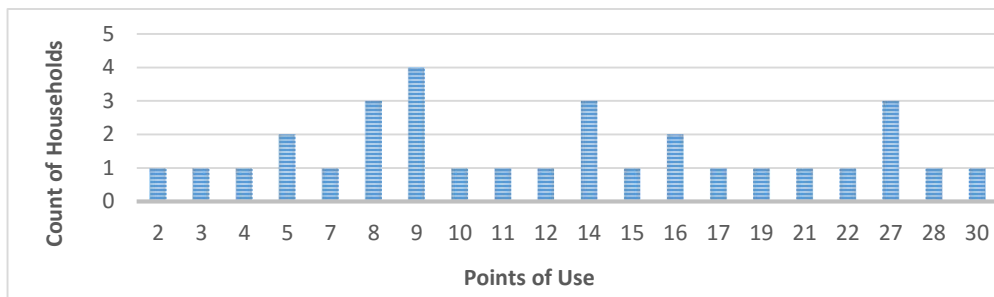
Agriculturally, only two of the women could report the agricultural electricity bill but neither could provide the physical bill as they are not aware of where it is kept. One reported it to



be 5,000 Rs. per month, owning three acres of land<sup>14</sup> and the other being 1,500 Rs. for the year. Both of these respondents answered that they have no issues paying the bills regularly domestically, but the household owning three acres of land said that they occasionally have to borrow to be able to pay off particularly large agricultural bills.

*Household Electricity Put to Use*

Of all 31 women surveyed, the households contained an average 13.7 points of use of electricity.<sup>15</sup> There was quite a wide range of how many points of use existed within each household, from one household having only two while another had thirty. The distribution is rather evenly distributed throughout this range, with nine points of use as the most common quantity amongst all respondents.



*Figure 4: Extent of Usage*

By far, the two most abundant uses of electricity in each household was for lighting purposes and the use of fans. The average household had four points of light use and three fans. The next most frequent use of electricity was in the use of a mobile, averaging at two per household. Other appliances were used at a much smaller average rate and were less commonly

<sup>14</sup> Three acres of agricultural land is large in the Indian context where most rural farmers have 0.5-1 acres.

<sup>15</sup> Points of use of electricity refers to a single entity that uses the electric connection of the household. For example, each individual bulb is considered a separate point of use.

used in each household. However, almost all of the households had a television and just over half had their own electric water pumps and refrigerators.

<b>Uses</b>	<b>Percentage of Sample</b>
Light	100
Fan	97
Mobile	97
Television	60
Water Pump	53
Refrigerator	53

*Table 2: Appliance Usage across Respondents*

When asked in what ways electricity was important in their life, the most common response was its ability to help with cooking. Six respondents have open kitchens<sup>16</sup> while the others have enclosed cooking areas. Only 50 percent of respondents have a specific light source in their kitchen while 13 percent have a fan.

<b>Uses</b>	<b>Percentage of Sample</b>
Kitchen Light	50
Kitchen Fan	13

*Table 3: Appliance Usage across Respondents*

However, electricity is not put to use as an actual fuel for cooking. The majority of respondents, 71 percent, use firewood as their primary fuel. Most households use more than one fuel for cooking, most often a combination between firewood and gas. Of all households, 84 percent use firewood as one of their cooking fuels while 32 percent utilize gas. Electricity and dung cakes are used by a small percentage of households and are often the secondary or tertiary cooking fuel utilized. Of those using firewood, most of the women, 62 percent, spend three to four hours daily gathering firewood. On the more extreme ends, nearly a quarter of respondents

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<sup>16</sup> An open kitchen refers to cooking in a place that is not enclosed by walls and is usually outside of the house

spend very little time, half an hour or less, gathering firewood while only 8 percent use five to six hours of their day gathering firewood.

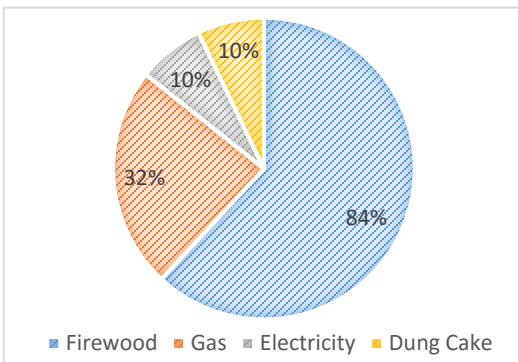


Figure 5: Mix of Cooking Fuels Used

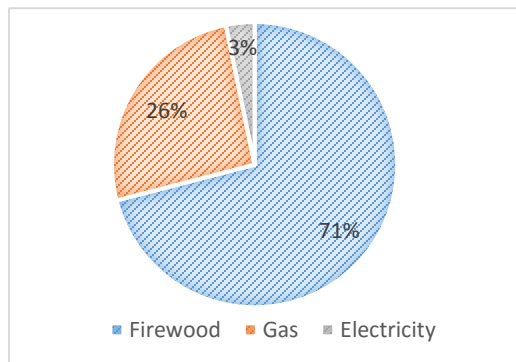


Figure 6: Primary Cooking Fuel Used

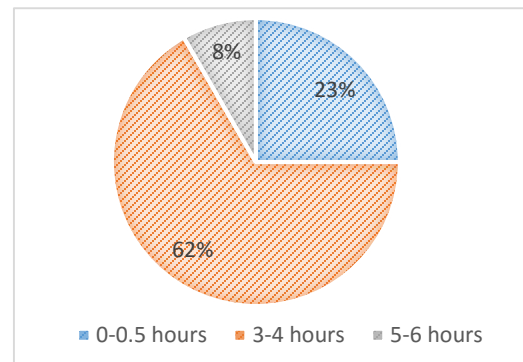


Figure 7: Hours Spent Gathering Firewood

### Women and Electricity

The final portion of the interview was in asking how the women themselves use electricity and to what extent they perceive its impact and importance in their life. First, women were asked, out of the electricity points of use in their home, which do they use personally for themselves. Of respondents who have a fan in their household, 90 percent said that it is for their personal use. Those with televisions only reported using it for themselves 83 percent of the time, and only 66 percent of respondents said they used the household mobiles.

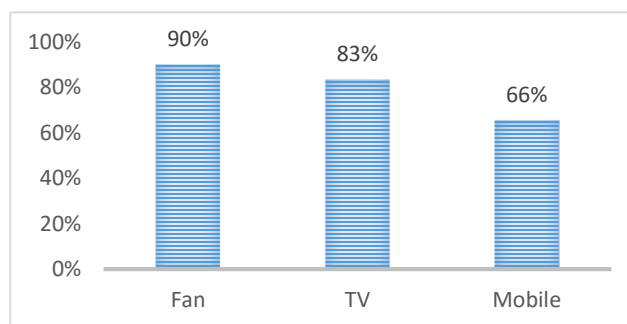


Figure 8: Woman's Use of Appliances

Afterwards, women were asked to answer true or false to a list of statements targeted at understanding where they see the impact of electricity on their lives. One hundred percent of

respondents agreed that their electricity access allows them to work longer days, while all respondents stated that it is both easier and faster to complete their household work. When women were asked to elaborate on how it impacts their lives, the main response revolved around providing more comfort and flexibility in their day-to-day responsibilities of household work. They are no longer dependent on the sun’s schedule for when they have to cook, and they can do the necessary work in the comfort of better lighting and a fan.

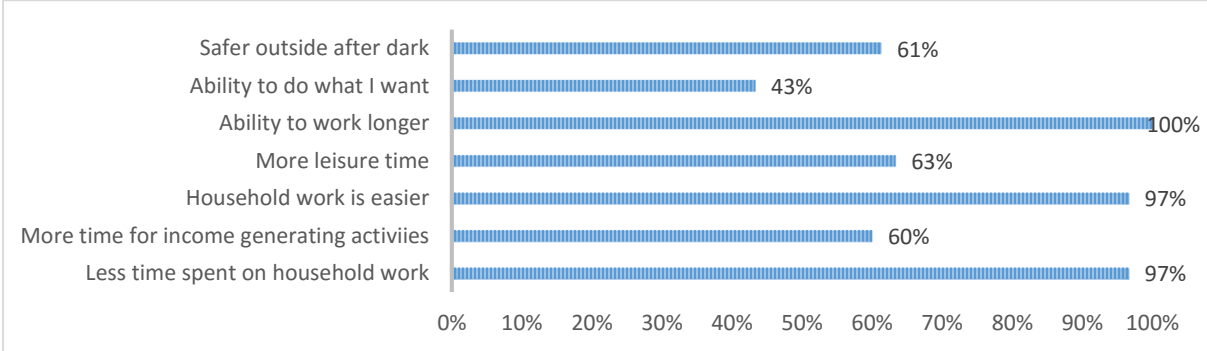


Figure 9: Self-Assessed Impact on Respondent

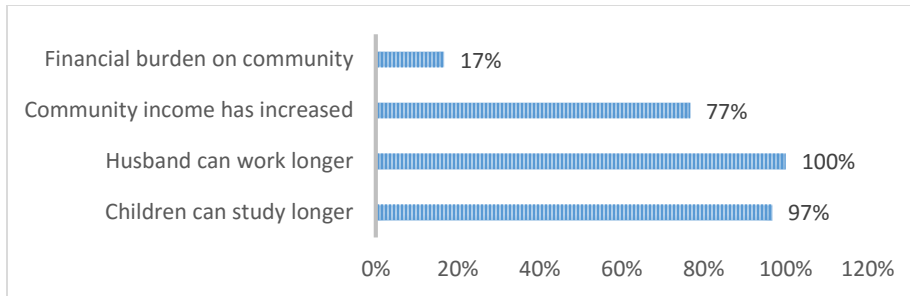
Approximately 60 percent of respondents said that having electricity enables them to have some amount of leisure time to themselves and the ability to manage their responsibilities and engage in income-generating activities. When asked to describe their leisure activities, the women responded that they rest in between chores or that they take an hour or two during the day to watch television. For 60 percent of respondents, they feel safe going outside their homes after dark in their village. All of those who responded “True” to this statement come from villages with streetlights, either solar or electric. Umralla was the only district where the respondents said their streetlights were solar-powered, installed as a result of a government scheme. For the 40 percent who do not feel it is safe to go outside after dark, 75 percent live in villages that do have streetlights, but they commented that there are not enough and are typically situated only along the main road of the village. The women reported that to go outside they use the light on mobiles, an electric powered torch, or they simply do not go outside after dark.

Less than half of respondents, 43 percent, said that with electricity they have the ability to do what they want. All but one of these respondents use a mixture of energy sources for cooking, mainly gas, kerosene, and even one person uses some electricity. These respondents all reported that they have no problems paying the electricity bills also. When respondents answered false to the question, they typically responded that electricity does not touch that part of their life, in which they are still restricted to household responsibilities and are at the mercy of the males in the household. Two women responded that they are still not free, and that electricity has actually just increased the workday of the woman.<sup>17</sup>

Shifting towards how the women have seen electricity impacting the lives of those around them, nearly all respondents agreed that household electrification has allowed their husbands to work longer and their children to study longer. Many commented on how before quality electricity access, kerosene lanterns provided insufficient lighting to work after dark. Seventy-seven percent of respondents perceive their community's overall income having increased as a result of quality electrification. Many commented that their friends and neighbors have family members working in diamond shaping and running small stores that are able to exist because of the quality electricity access now. Only 17 percent see their community members struggling to pay the electricity bills, and these respondents were also those who reported financially struggling themselves.

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<sup>17</sup> Anonymous, Personal Interview, Keriya, Umralla, April 22, 2016; Anonymous, Personal Interview, Khijadiya, Umralla, April 22, 2016.



*Figure 10: Respondent's Perception of Impact on Others*

### *The One without a Connection & the One with an Illegal Connection*

Out of all 31 respondents, one woman lived in a home without an electricity connection. She has been living in a government settlement outside of the village for three years that provides free housing to those in poverty, and it has not been connected to the electricity grid. According to her, the settlement has 15 houses now and once a total of 25 houses are built the government will connect them to the electricity grid. Despite not having her own connection in her settlement, because everyone in the main village has electricity she still feels that she benefits because she goes to other homes to draw water from their pumps or use their outlets to charge their mobile. They own three appliances themselves, two mobiles and a mixer, for which they ask the villagers if they can use their outlets to charge them. Living about thirty minutes walking outside of the village, she travels between the village and her home between two and five times in order to collect water and firewood. She has to make sure everything she needs from the village is completed before sunset so she can walk back when it is still light out and spends her entire day doing household work while her husband has a small food stall in the village. Before she was married, she grew up in a home which had electricity and stated that life is more difficult now with many more limitations on what she can do.

Not all of the homes with their own electricity connection had a legal connection. One household used to have their own legal connection but they were unable to afford the bills so the Gujarat Electricity Board disconnected them and removed their meter. Their previous meter was connected through a government scheme for households' below-the-poverty line. According to the respondent, they were supposed to be able to pay their bill in gradual amounts but instead they were given a bill of approximately 8,000 Rs. in a year to be paid all at once at the end of the year. This was too much for them to pay all at once so their connection was severed. Now their household is illegally connected to their neighbor's feeder and they contribute half of the money to the electricity bill. This interview occurred with the presence of other villagers who, when it came to the topic of illegalities, shared their own personal actions. Two men particularly said that they have been fined penalties by the Electricity Board for supposed illegal tampering with their meters to keep the charges down. When asked whether they were tampering with their connections, they admitted to doing so. One man said he was fined 44,000 Rs while the other one was fined 22,000 Rs. To them, this is an amount to which they have no ability to pay.

#### *A Stakeholder's View*

Throughout the study, I spoke to two different stakeholders to gain their view on how JGY has impacted their community. Speaking with the head of the Ramdhari village Panchayat,<sup>18</sup> he asserted that JGY was a huge benefit to the village and all its members. He asserted that with the quality electricity it provided, there is now increased employment opportunities with sewing machines, diamond shaping, and improvements to agricultural productivity with water pumps. With greater farming productivity, more laborers can be hired to

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<sup>18</sup> Anonymous, Panchayat Member, Personal Interview, Ramdhari, Sihor, April 27, 2016.

work on the fields. Before JGY, according to him, there was unemployment and people were migrating to nearby urban centers in search of work. Sometimes electricity would be cut for full weeks and was completely unpredictable. Now, he reported that there is no migration to urban areas and that people have the ability to sustain their lives in the village because of quality electricity connection. All of the women from this village reported not having adequate street lighting to make them feel safe outside after dark and when asked about this, the panchayat leader reported that they have difficulties with funding to invest in streetlights. As they rely on each household paying a small flat tax to contribute to the Panchayat's funds for village projects, many households do not pay this and they focus on trying to use the money they get from the government for the most pressing issues, which have been largely water-related.

In speaking with the Deputy Engineer of JGY for the Sihor Taluka District,<sup>19</sup> he described fully the way in which JGY has transformed the context of rural electricity in rural life. A primary point of his was that before JGY the lack of an electricity connection strong enough to be reliable and to support various points of use hindered village businesses and stunted the village economy. Another main point is that before JGY, villagers were not able to do anything after dark, inhibiting economic activities as well as personal activities that allow people to lead full lives. Now, they have seen a decline in migration to urban centers, an increase in village business, and the simple ability for people to continue their activities after dark, enabling greater income generation and life satisfaction.

A major difficulty their office faces is that of Transmission and Distribution (T&D) losses where people tamper with the feeders and meters to use electricity and not be charged for it, or to

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<sup>19</sup> M.V. Borisa, Deputy Engineer, Sihor Taluka, April 19, 2016.



use electricity from the non-agriculture feeders for agricultural purposes. He reports that they see 75 percent T&D losses in the village, presenting a large problem that is difficult to combat with limited manpower and the general resistance from villagers towards inspections. However, in the urban areas he reports that T&D losses have been dramatically reduced after JGY from 40 percent to only 10 percent. Their main source of revenue is from industrial electricity consumers, who pay for electricity at much higher rates due to their requiring high-intensity connections. They have forty high-intensive consumers which are their main source of income, specifically rolling mills of the steel industry.

When asked about how he thinks women benefit from JGY, he remarked that as overall living standards have increased in villages, this has lifted the quality of life for women with it. Women can use appliances with electricity such as a grinder, mixer, and washing machine due to new stability of power, which help in performing household work. He sees the supply of stable, quality electricity as the primary driver of Gujarat's development. From his perspective, the entire country should implement their own version of the JGY scheme and that it would see 100 percent success rates around the country.

### Discussion

With electricity's core role in modern societal life and economic operations, growing calls for rural electrification and universal electricity access for all in the 1960s and 1970s emerged with hopes of quick development outcomes advancing from it. As with most issues when it comes to development, the simplicity of its vision does not match the reality of implementing the provision of electricity access on the ground. India has focused largely on the development of the central-grid system which inherently prioritizes dense population centers.

Although villages have increasingly been the target of government programs<sup>20</sup> and have been gaining electrical infrastructure, much of the rural areas still face a dearth of connectivity both in absolute terms of deficient infrastructure as well as in relative terms of having a much lower quality of access than their urban counterparts. Growing attention is put on the number of villages being electrified with states being sorted by percent electrification.<sup>21</sup> The notion of becoming “electrified” is widespread through the discourse but to be deemed electrified does not bring about clarity as to the extent of electricity access or the on-the-ground realities to electricity provision.

The most standard definition by the Government of India, as of 2004, deems a village as electrified when basic infrastructure is made available, including at least one hamlet and any public places with the minimum requirements of at least 10 percent of total households in the village connected.<sup>22</sup> With this minimum definition, there exists a large variety in electricity across states from Jharkhand having 31 percent of villages connected compared to 100 percent in Haryana. Thus, claiming success by focusing on village electrification rates is by definition inadequate if one wants to measure household wellbeing off of electricity access. With the documented difficulties aforementioned, “even though the villages were ‘electrified’, actual access to electricity was extremely limited. In other words, there was energy poverty even though most villages had been electrified”.<sup>23</sup> The reason the Gujarat case stands out is in its ability to reach its villages and provide rural areas with uninterrupted and reliable electricity supply. Gujarat, as this study shows, has been successful in providing connections to all but one

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<sup>20</sup> See Appendix 1 for reference to history of India’s electrification programs

<sup>21</sup> See Appendix 2 for current status of state electrification rates

<sup>22</sup> Bilolikar, Rajkiran, and Ravi Deshmukh. Rural Electrification in India – an Overview. National Power Training Institute, Faridabad.

<sup>23</sup> Mishra, Pramod K. “ALLEVIATING ENERGY POVERTY THROUGH INNOVATION: THE CASE OF JYOTIGRAM YOJANA (RURAL LIGHTING SCHEME) OF GUJARAT.” India Energy Congress 2015 (2015).

of the rural households interviewed, and the single outlier lives within a government settlement in the process of development that has plans to be connected to the grid. Those living in the villages attested to the fact that each household in their community, to their knowledge, had their own connection. This indicates that not only did Gujarat electrify its villages, but it succeeded in connecting all of its households as well for the true status of being 100 percent electrified.

The status of rural electrification throughout the country also has very inconsistent degrees of electricity access, with World Bank 2015 estimates showing that 18 percent of rural households report outages of up to four hours a day, while 20 percent face intermittent power supply throughout most of the day.<sup>24</sup> Illustrating the incapability of the system set up to provide electricity access, load shedding is a prevalent occurrence that states will use to mitigate the demand on their system. Due to the low priority of rural households for private utilities, power supply to rural areas are usually the first to be cut. Gujarat implemented a bifurcation of feeders to segregate agricultural and non-agricultural purposes which has allowed for more control over the supply as well as how much demand is put on the feeders. As a result, we see that residents do enjoy an improved quality of electricity with just over half of participants having no irregularities in their supply and almost three-quarters of respondents saying that they always have electricity when they want it. Not everyone in our sample has the proclaimed 24/7 domestic access but only one-fourth of respondents indicated that this interfered with their desired usage. Out of the 14 respondents who experience some form of cuts, 79 percent only experience the cuts one day out of the week. This is an improved standard of quality as compared to the World

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<sup>24</sup> Banerjee, Sudeshna Ghosh, Douglas Barnes, Bipul Singh, Kristy Mayer, and Hussain Samad. 2015. Power for All: Electricity Access Challenge in India. World Bank Studies. Washington, DC: World Bank.

Bank findings for residents across India and shows the ability for households to consistently have access that they can depend upon.

The segregation of the feeders also enables the electricity company to control pricing based on the intended use of the electricity. In the many decades of seeking progress in rural electrification, the inability to secure financial sustainability among rural consumers has been a large impediment. As one of the primary reasons bringing about the transformation of the electricity sector towards marketization, the new structure relies on financial profitability in order to maintain investments and commitment to rural consumers. As the JGY Deputy Engineer of Sihor states, it is from their industrial consumers that they make enough revenue to be financially sustainable. In Sihor, they have 40 high-intensity consumers of electricity who pay the higher consumption rates primarily from the steel industry. This allows domestic and agricultural consumers to continue paying low consumption rates while keeping the local electricity authorities financially afloat to ensure the connection is adequately maintained. The connection appears obviously, the stability of electricity and its ability to cater to high-intensity needs of industry brings business to the area while also keeping the electricity companies able to achieve financial recovery to continue serving these interests. This all requires the initial investment by the government to ensure this access to potential businesses, to which we have seen great success in Gujarat. The positive externalities of such government planning has allowed rural residents to benefit tremendously with marked improvements in their own electricity connection.

Studies have assessed the impact of JGY on the rural villages electricity had been introduced to in regards to the number of people connected and the quality of access. Improvements were found in more households consuming electricity, overall transmission and

distribution losses had declined, and the duration of electricity had increased.<sup>25</sup> Some of these points have been reaffirmed by this study with all living in registered villages having a household connection and remarking on their improved duration of supply after JGY. The stakeholders I spoke with as well as 77 percent of respondents reported that with JGY local business and overall incomes have increased for those in the village. Many reported family members working in diamond shaping, an industry requiring electricity connection that has been able to situate itself in rural areas with the stability of connection.<sup>26</sup>

Still, electricity is not the exclusive source of lighting for rural households. Whether due to financial limitations or the unreliability of electricity, the World Bank Study estimates that about 70 percent of grid-connected households use kerosene as a backup lighting source. This results in poor households with electricity having higher expenditures just for lighting in and of itself, adding electricity and kerosene costs. In this study, only five households responded that kerosene is one of their sources of lighting. However, of the fourteen respondents who have irregularities in their electricity supply, they all answered that they do use kerosene when there are cuts. This indicates external expenditures for lighting purposes on top of the electricity bills collected in this study, yet the gap between the two responses seems to indicate that most households do not see the cuts, and thus the need to use kerosene, as a significant part of their lighting needs. Not being able to rely on quality provision of electricity is a strong disincentive for rural households to invest in the connection. However, Gujarat's managed a stability of supply that has encouraged families to invest and keep their connection, indicating electricity as their entire source of lighting.

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<sup>25</sup> Mishra, Pramod K. "ALLEVIATING ENERGY POVERTY THROUGH INNOVATION: THE CASE OF JYOTIGRAM YOJANA (RURAL LIGHTING SCHEME) OF GUJARAT." India Energy Congress 2015 (2015).

<sup>26</sup> M.V. Borisa, Deputy Engineer, Sihor Taluka, April 19, 2016.

Outside of lighting sources, electricity is still used in a limited scope for rural households. As noted in the findings, electricity serves families through lighting, fans, mobiles, and a television. Each of these have their own benefits to the household yet seldom are the impact of having these objects in the home inspected in reference to the women within. Some of the key points from various studies and reports show that with electricity provision, women overall are more likely to be able to engage with activities that promote learning, health, leisure, and income that create balanced livelihoods. The introduction of household electrification reduces the amount of time spent on women-dominated time-intensive tasks such as water as well as fuel collection and cooking.<sup>27</sup> In 2004, a World Bank Report found that women with electricity in their homes did have more time to engage in a variety of other self-benefitting tasks.<sup>28</sup>

This study found a relatively consistent narrative of electricity usage throughout the villages. The primary impact electricity has had on the rural life of women has been for very basic household uses which provide flexibility and comfort. The women in this study all seemed to agree that having electricity in their home is extremely important to them, with many of them unable to imagine their lives without electricity just like many of us all over the world have gotten accustomed to the small comforts electricity provides. For them, improvements were being able to do the cooking on their schedule rather than on that of the sun and having fans that keep away mosquitos and provide comfort to them and their family in the heat. With the simple introduction of better quality lighting and a cooling device, the ease with which household work

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<sup>27</sup> Mathur, Jaskiran Kaur, and Dhiraj Mathur. "Dark Homes and Smoky Hearths: Rural Electrification and Women." *Economic and Political Weekly* 40, no. 7 (February 12, 2005): 638-43; Prayas Energy Group, Pune, comp. Proceedings of Report of the Round Table on Gender and Electricity, India, New Delhi. September 26, 2014.

<sup>28</sup> Mathur, Jaskiran Kaur, and Dhiraj Mathur. "Dark Homes and Smoky Hearths: Rural Electrification and Women." *Economic and Political Weekly* 40, no. 7 (February 12, 2005): 638-43.

can be done and the ability to manage all of the responsibilities of the woman has remarkably improved.

However, others argue that electricity policy and discourse needs to more specifically target women's needs rather than simply assuming the provision of electricity access will go to the benefit of the women. According to a report from the UNDP, "in many cases, the provision of electricity without attention to the provision of modern cooking fuels or appliances has resulted in rural electrification that in fact increases the hardships of women because the working day is prolonged while the traditional fuel use patterns remain in place".<sup>29</sup> The predominant fuel for cooking amongst respondents remains firewood, with the majority of women spending 3-4 hours of their day to gather it. For those in rural areas, which is approximately 60-70 percent of India's population, traditional biomass remains the dominant source of energy for household use, with agricultural use relying on human and animal power.<sup>30</sup> With most of the households lacking kitchen fans, the health conditions within the kitchen due to the specific fuels used make women particularly vulnerable. Despite some of the women of this survey working, either as laborers or in local social work positions, they still are responsible for all the caretaking tasks of the house. The introduction of domestic water pumps dramatically helped women in not having to travel far in order to gather water. In addition, the presence of flour mills allow women to purchase such cooking necessities that previously they would have had to grind themselves,<sup>31</sup> an extremely laborious and time-intensive process.

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<sup>29</sup> Lacayo, Antonio I. "Off-grid Energy in Rural India: Policy Recommendations for Effective UN Projects." Princeton University, WWS Undergraduate Task Force: Energy for Sustainable Development (May 8, 2006).

<sup>30</sup> Lacayo, Antonio I. "Off-grid Energy in Rural India: Policy Recommendations for Effective UN Projects." Princeton University, WWS Undergraduate Task Force: Energy for Sustainable Development (May 8, 2006).

<sup>31</sup> Anonymous, Personal Interview, Keriya, Umralla, April 22, 2016; Anonymous, Personal Interview, Panch Talavada, Sihor, April 26, 2016.

These time-saving activities have had spill-overs in other areas, allowing women to balance all of their responsibilities so they can work or their daughters can attend school. The burden of energy typically falls on women, as their responsibility for household wellbeing comprises their day of gathering energy sources of fuelwood and water, which takes time away from other productive pursuits such as income-generating activities or studies.<sup>32</sup> Electricity does in fact lengthen the ability for all people to work longer hours, as nearly all respondents attested to, due to having lighting after dark, but does not largely go towards the appliances that would drastically impact the amount of time women spend gathering fuel for cooking and cooking itself. A few women commented on how now they are even busier, without anything enabling their freedom. Lacayo argues that the typical way in which electricity provision is thought to impact women ignores the large difference between the way in which men and women interact with energy sources where “[w]hile men see energy as a luxury enabling more time for leisure, energy helps women accomplish their daily tasks”.<sup>33</sup> This seems to be apparent in this study, indicating that while women’s days of household work are elongated, men are able to enjoy the extra leisure and entertainment.

Women internalize the messages of being the ultimate caretaker, where women are valued for putting the least priority on their own needs. A few women commented that when their household faces difficulties paying the electricity bill, they often mortgage their own jewelry. When asked about their personal use of such comfort appliances as the fan, the television, and the mobile, none were personally used by 100 percent of the women who have

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<sup>32</sup> Khandker, Shahidur R., Douglas F. Barnes, Hussain A. Samad. “Energy Poverty in Rural and Urban India.” The World Bank Development Research Group Agriculture and Rural Development Team. Policy Research Working Paper (November 2010).

<sup>33</sup> Lacayo, Antonio I. “Off-grid Energy in Rural India: Policy Recommendations for Effective UN Projects.” Princeton University, WWS Undergraduate Task Force: Energy for Sustainable Development (May 8, 2006).



them in their homes. Responses such as “Oh, I don’t use the fan, that is for the children”, or, “My husband uses electricity the most and watches television the most” occurred multiple times.<sup>34</sup> This shows how the societal dynamics between men and women surface even within the topic of electricity usage. Many of the women who made these remarks also come from households who have difficulties paying the bills which shows how women often internalize the household’s struggles to sacrifice their own comfort even when the rest of the family will continue to watch television or sit under the fan if they feel hot. They are expected to make sacrifices no one else in the family is held to. Those who do watch television, remarked that it was only when they found a free hour which often did not happen regularly. The women who commented that they use the mobile phones would often say that the mobile was not primarily theirs but they could answer the phone or put in a call if they needed to. Although subtly and never with the statement of not being allowed to use such appliances, the disparate role of the woman in the home came through in their responses and their narratives on how electricity is in their lives.

The presence of electricity also impacts women in regards to needs of public safety. Despite most of the villages having streetlights, too many women still feel unsafe being outside after dark due to a lack of public lighting. Without sufficient public lighting, women are even more limited in their abilities and at risk when they do need to be out at night. The development of electricity in rural life can continue to help women in small but important ways, making it easier to go about their daily lives. Nonetheless, even with the entire village covered in working streetlights, women still face the inability to be outside comfortably after dark due to social

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<sup>34</sup> Anonymous, Personal Interview, Alampar, Umrالا, April 15, 2016; Anonymous, Personal Interview, Dhamnaka, Umrالا, April 15, 2016; Anonymous, Personal Interview, Ramdhari, Sihor, April 27, 2016; Anonymous, Personal Interview, Ramdhari, Sihor, April 27, 2016.

norms. These norms remain the heaviest weight on women throughout the inability for electricity to truly make an empowering impact on women's lives.

### Conclusion

Electricity as a paradigm for development is largely discussed and agreed to be an empowering factor for the majority of people. However, its ability to be a developing force for those marginalized by society is uncertain. For many of the households interviewed, electricity has added an additional burden while for others it has allowed their incomes to increase dramatically. The societal position of women remains a powerful force that interjects into the ability for women to reap the full benefits of modern energy. Women still are not the primary users of most of the electric appliances, only reaping benefits of comfort and flexibility in their day-to-day lives. However, the impact of electrification in their lives should not be discredited. All of the women see having electricity as far better than not having it. To them, it is a dramatic shift in the conditions they have to endure to go through their day and it has reduced the need to do certain labor-intensive tasks of flour grinding or water gathering from far away. The case of Gujarat's reforms in 2003 provides a unique success story within the nation of providing quality service with dependable supply to both its urban and rural areas. JGY has bolstered rural life economically and socially, and for the women of these households it has given them an improved environment while their position within it still remains the same.

## Way Forward and Recommendations for Further Study

This topic merits a larger study over a longer period of time with a more robust research design in order to truly explore the previous findings. With more women sampled from more parts of the state, a clearer picture of how JGY has impacted rural women can be seen. A longitudinal study over various years could also look at how electricity usage may evolve over time, and whether women see any impact after more time has passed. This study exposed some elemental components of women's lives with regards to electricity access, and much more can and should be done to unearth how women are impacted by these changes in the home. This kind of insight will be useful in crafting programs and policies meant to address issues of women, cleaner energy, and fuel use. Development does not come through infrastructure development alone, it is the people who should be the true aims of development planning which requires an understanding of such dynamics that keep women from benefitting

On another note, not enough data was collected to truly make any certain statements on the topic of billing yet there are some interesting observations to be made. One household with 12 points of electricity use has a bill that is more than double the bill of a household with 30, the higher, points of electricity use. The difference is not minimal with the household that has 12 electricity points being billed 3,000 Rs versus the 1,200 Rs for the household with 30. Even more, a household with 15 points of use has a bill of 5,000-6,000 Rs. For these families that amount of money is equivalent to what they need to spend on food for their families. Figure 12 below shows the correlation, or lack thereof, between how many points of use a household has and their average bill. Of course, the quantity of electricity usage points does not indicate how much a household is specifically using or consuming compared to each other. Also, a possible explanation can be that of owning appliances that consume more electricity in and of themselves

because they are older models or technology that does not abide by the current standards.

Regardless, this presents a spot for future research and in-depth exploration as to the way in which electricity usage is billed and its accuracy. Affordability of services such as electricity are integral in their use and the potential expansion of its role in the rural areas across developing countries.

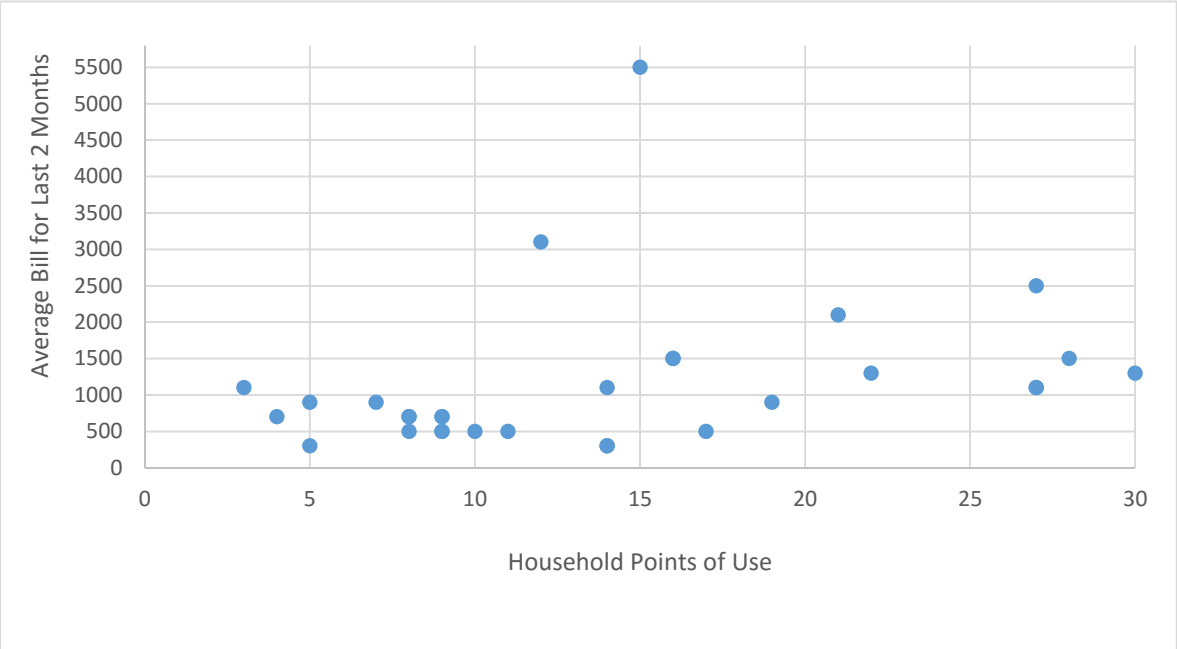


Figure 11: Correlation between a household’s total points of use and their average electricity bill for the last two months

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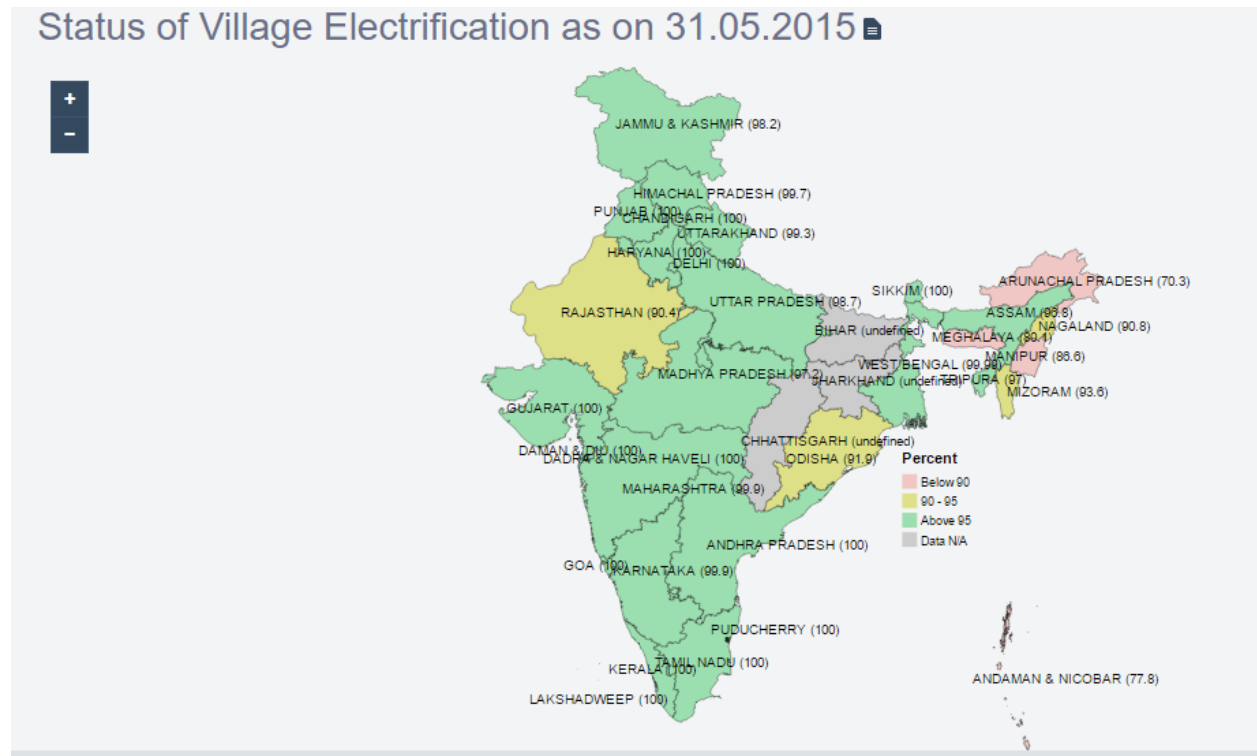


## Appendix 1: History of the Government of India's Rural Electrification Programs

<u>Year</u>	<u>Program</u>	<u>Key Focus</u>	<u>Implementing Agency</u>
1948	<b>Electricity Act</b>	<b>Creation of electrical grid system Creation of State Electricity Boards and the Central Electricity Authority</b>	<b>Central Electricity Authority under the central government and State Electricity Boards</b>
1969	<b>Rural Electrification Corporation Established</b>	<b>To promote rural electrification focused on agricultural use</b> <ul style="list-style-type: none"> <li>• Irrigation pump electrification</li> </ul>	
1974	<b>Minimum Needs Program</b>	<b>Rural household electrification</b>	<b>State Electricity Boards with funding administered by the central government to the States</b>
1989	<b>Kutir Jyoti Yojana</b>	<b>Single point light connections for households below the poverty line</b>	<b>State Electricity Boards</b>
2001	<b>Pradham Mantri Gramodaya Yojana (PMGY)</b>	<b>Rural Electrification added to human development program</b>	<b>State Electricity Boards/Electricity Departments/Power Utilities</b>
2002	<b>Remote Village Electrification (RVE)</b>	<b>Use of stand-alone, solar photovoltaics and other non-conventional energy sources, for remote villages</b>	<b>Ministry New and Renewable Energy</b>
2002	<b>Rural Electrification Supply Technology (REST)</b>	<b>Renewable energy and decentralized technologies from locally available resources</b>	
2003-04	<b>Accelerated Rural Electrification Program (AREP)</b>	<b>Electrification of un-electrified villages through subsidizing electricity companies</b>	<b>State governments through State Electricity Boards/Power Utilities</b>
2005	<b>Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY)</b>	<b>Electricity all villages with more than 100 people, free electricity connections to households below the poverty line</b>	<b>Rural Electrification Corporation</b>
2005	<b>Remote Village Electrification</b>	<b>Population of less than 100 inhabitants. Use of decentralized solutions</b>	<b>Ministry of New and Renewable Energy (MNRE)</b>
2009-10	<b>The Jawaharlal Nehru National Solar Mission</b>	<b>Large grid of solar plants as well as off-grid and decentralized solar solutions</b>	
2015	<b>Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)</b>	<b>Separation of agriculture/non-agriculture feeders</b>	

## Appendix 2: Categorization of States by Electrification Status

Source: Government of India



Appendix 3: Sample Survey					
household characteristics				Particulars of household member	
1. how many people do you share a kitchen with? (by age and by gender)	Age	Qt. Male	Qt. Female	10. sex (male-1, female-2)	
	Children under 6				
	Children 6-18				
	Adults 18-30				
	Adults 30-50				
2. household type (code)				11. marital status of respondent (code)	
3. religion (code)					
4. social group (code)					
5. whether owns any land (yes-1, no-2)					
6. is any member of the household a regular salary earner? (yes-1, no-2)					
primary sources of energy for...	8. cooking (code)				
	9. lighting (code)			Average time spent <u>per day</u> gathering lighting sources	Average cost <u>per month</u> spent on lighting sources
<b>CODES</b>					
item 2: household type :	<i>self-employed in agricultural labour – 1, construction work – 2, farming/fishing – 3, others – 4</i>				
item 3: religion :	<i>Hinduism–1, Islam–2, Christianity –3, Sikhism– 4, Jainism – 5, Buddhism – 6, Zoroastrianism – 7, Tribal – 8, others –9</i>				
item 4: social group :	<i>Scheduled Tribes – 1, Scheduled Castes –2, Other Backward Classes– 3, NT-DNT – 4, others –9</i>				

item 8: <b>primary source of energy for cooking :</b>	<i>coke, coal – 01, firewood and chips – 02, LPG – 03, gobar gas – 04, dung cake – 05, charcoal – 06, kerosene – 07, electricity – 08, agricultural residue – 09, others – 10, no cooking arrangement – 11</i>
item 9: <b>primary source of energy for lighting :</b>	<i>kerosene – 1, other oil – 2, gas – 3, candle – 4, electricity – 5, others – 9, no lighting arrangement – 6</i>
item 11: <b>marital status :</b>	<i>never married – 1, currently married – 2, widowed – 3, divorced/separated – 4</i>

### Use of Electricity by the Household

1. Are you a beneficiary of 'Jyoti Gram Yojana'? (yes -1; no-2) \_\_\_\_\_
2. How many years ago did your household get electricity? \_\_\_\_\_
3. Did you have a choice in acquiring electricity? (yes-1, no-2) \_\_\_\_\_
4. Place an 'X' in the box of the appliances you use electricity for in your home and indicate the quantity of each you have in your home.

	'X' if within your home	Quantity within your home
Electric bulb		
Television		
Water Pump		
Electric Fan		
Refrigerator		
Electric iron, heater, toaster, oven & other electric heating appliances		
Other cooking/household appliances		
Mobile handset/telephone instrument		

5. Place an 'X' next to the times your household would like to use electricity in a normal day?

Before 5:00	
5:00-8:00	
8:00-12:00	
12:00-15:00	
15:00-19:00	
19:00-22:00	
22:00-24:00	

6. Place an 'X' next to the statement that reflects your electricity access reliability:

We <u>always</u> have electricity when we want it	
We <u>sometimes</u> have electricity when we want it	
We <u>rarely</u> have electricity when we want it	

7. In the last week, how many hours a day does your household have electricity access?

Agricultural purpose	
Domestic purpose	

8. What was your average electricity bill for the last 3 months?

Agricultural purpose	
Domestic purpose	

9. What percentage of your monthly expenditure is spent on electricity? \_\_\_\_\_

10. Are you able to pay your electricity bill regularly without any problem? (yes-1, no-2) \_\_\_\_\_

a. If no, what are the reasons? \_\_\_\_\_  
 \_\_\_\_\_

11. Do you know the per unit charge of consumption for your electricity use? \_\_\_\_\_

12. Who is the primary user of electricity in your household for each of the listed activities?

*Myself-1, My husband-2, My children-3, the whole family-4*

Cooking	
Lighting	
Irrigation	
Enterprise Activity	
Other household activities	

### Use of Electricity by Women in the Household

13. Which of the following gadgets do you operate on your own?

Electric bulb	
Television	
Radio	
Electric Fan	
Refrigerator	
Electric iron, heater, toaster, oven & other electric heating appliances	
Other cooking/household appliances	
Mobile handset/telephone instrument	

14. Do you think you have personally gained from having electricity at home? (yes -1, no -2)

\_\_\_\_\_

15. If yes, how have you been impacted? Indicate whether the below statements are true or false (true-1, false-2)

I spend <u>less</u> time doing household chores	
I am able to devote <u>more</u> of my time to income-generating activities	

It is <u>easier</u> to do my work	
I am able to spend <u>more</u> time engaging in leisure activities for myself	
I can work <u>longer</u> into the night	
I feel I have <u>more</u> ability to do what I want	

16. If no, please explain why you could not personally benefit.

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17. How have others been impacted after gaining electricity? Indicate whether the below statements are true or false (*true-1, false-2*)

My children are able to study longer	
My husband is able to work longer	
Income from agriculture has increased overall	
My community is more connected to information sources	
My friends and I enjoy more entertainment sources	
My community has benefited from gaining electricity	
My community now has more difficulties with payment	

18. Has anything else changed for you since gaining electricity? (open response)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

19. Which of the below community lighting sources are in your community? Place an 'X' to indicate existence.

Streetlights	
Lighting in Schools	
Anganwadi	
Others	