

# The Jamaica Social Investment Fund and the Jamaica Public Service Company: Partnering for Electricity Regularization through Community Renewal

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**Abstract:** As a small-island developing state (SID) and an integral member of the Caribbean Community (CARICOM), Jamaica is very concerned about climate change, community development, and specifically access to safe, reliable, and affordable energy. In the urban centres, where the heat island effect is more likely to occur, safe and reliable energy sources become urgent as many urban residents live in informal settlements. Informal settlements consume as much as three times the energy consumed by regularized customers of the Jamaica Public Service. However, electricity is an essential service that cannot be denied. As other nations grapple with this challenge, Jamaica is also attempting to find the best energy solution for all current and potential customers, ensuring social inclusion and facilitating national development. This article explores the partnership between the JPS and the JSIF, presenting an innovative approach to community renewal in an effort to reduce the problem of electricity theft for the JPS, and also to give the residents of JSIF communities a competitive advantage in their socio-economic environment.

**Keywords:** Jamaica, energy, Jamaica Social Investment Fund, Jamaica Public Service, community renewal, sustainable development.

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## I. INTRODUCTION

Trees should be maintained along the roadways to reduce the heat island effect and reduce the need of air conditioning units. Tax incentives should be offered to existing enterprises and new industries to green the land around their buildings. They should also receive credits for employing alternative energy sources like liquid natural gas, solar energy and using building materials that will cool the building and allow more natural light into buildings, ultimately reducing the use of electricity. Incentives can also be offered for retrofitting buildings to meet green standards and reduce emissions (Mitchell, 2012).

As a small-island developing state (SID) and an integral member of the Caribbean Community (CARICOM), Jamaica is very concerned about climate change, community development, and specifically access to safe, reliable, and affordable energy. In the urban centres, where the heat island effect is more likely to occur, safe and reliable energy sources become urgent as many urban residents live in informal settlements (CRP-PIOJ, 2013; Mitchell, 2016a). According to local estimates, informal settlements, “characterized by poor infrastructure, limited employment and employability,” (JPS-JSIF, 2016, p. 3), consume as much as three times the energy consumed by regularized customers of the Jamaica Public Service. However, electricity is an essential service that cannot be denied. As other nations grapple with this challenge, Jamaica is also attempting to find the best energy solution for all current and potential customers, ensuring social inclusion and facilitating national development.

Access to legal electricity is essential for educational advancement, economic enterprise, social services, and overall community security. Jamaica has one main power supply company – the Jamaica Public Service Company (JPS) which supplies power to customers across the island. The Jamaica Social Investment Fund (JSIF) is committed to alleviating poverty in Jamaica, and providing a competitive advantage for their clients through strategically “investing for community development” (JSIF, 2016a). So, in an effort to achieve development through community renewal, a JPS-JSIF partnership emerged as a response to the problem of electricity theft which threatens the economic viability of the JPS and the country, as well as poses a threat to residents with illegal connections. Reports indicate that “the JPS loses over 18 per cent of all electricity generated in Jamaica predominantly through illegally tap in on the electricity grid by metered and unmetered consumers” (JPS-JSIF, 2016, p. 3). The options were either forced restrictions to curtail the problem, or community renewal through partnerships with agencies like the JSIF who are committed to improving the quality of life for those living in

poverty. As JSIF had previously piloted such a programme (JSIF, 2013) their expertise made them the obvious choice (JSIF, 2013; Sweeney, 2013; Sweeney & McDonald-Watson, 2014).

This article explores the partnership between the JPS and the JSIF, presenting an innovative approach to community renewal in an effort to reduce the problem of electricity theft for the JPS, and also to give the residents of JSIF communities a competitive advantage in their socio-economic environment. The following sections highlight the major partners in the project, the JPS and the JSIF. It proceeds with the methodology employed to regularize energy consumers, presenting results of the work that has already been completed, and the consumption pattern of newly regularized customers. The final section highlights the importance of community renewal through electricity regularization, and its impact on social development.

### **Electricity Regularization: A Global Partnership**

One of the most important sustainable development goals (SDGs) is access to affordable and clean energy (United Nations, 2016). In addition to reducing poverty, global partnerships continue to promote sustainable development strategies which include climate change and clean energy, social inclusion, demography and migration, public health and sustainable transport (European Commission, EU, 2016). In Jamaica, multilateral agencies such as the World Bank (IBRD), the Department for International Development (DFID), the Canadian International Development Agency (CIDA), the USAID, and local public and private sector agencies, continue to fund programmes aimed at achieving the SDGs for affordable and clean energy, combined with decent work and economic growth, sustainable cities and communities, and reduced inequalities (Mitchell, 2016b; UN, 2016). Consequently developments in the energy sector with JPS' introduction of anti-theft measures, investments in upgrading their current systems, and investments in renewable energy by the BMR Wind Farms in St. Elizabeth, will ensure that Jamaicans will not be left behind in the race for affordable and clean energy. This is of particular importance to those who do not have access to legal electricity in order to decrease their risk for community fires, death by electrocution, and damage to numerous appliances and electricity generation and distribution systems.

Research continues to show that integrated approaches to community development are the most effective (CRP-PIOJ, 2013; JSIF, 2013; KEMA, 2012, 2013; Mitchell, 2012; 2016; United States Agency for International Development, USAID, 2009). This is particularly true as it relates to reducing nontechnical losses in the energy sector. An example of this is the Slum Electrification and Loss Reduction (SELR) program piloted by the USAID in São Paulo, Brazil. In collaboration with the International Copper Association (ICA) and AES Eletropaulo, a local electricity distribution company, they designed a programme aimed at reducing the electricity losses from theft and non-payment in slums. Additionally, the programme aimed to provide more reliable and safer electricity service for the residents and assist them in significantly reducing their electricity consumption to affordable levels (USAID, 2009, p. 1). The programme was implemented in 4 phases:

1. Pre-regularization - contacting the community leadership and other stakeholders to gain support for the project, customer mapping and registration, an extensive community campaign to prepare the population for the upcoming changes, including distributing printed materials, hosting community events, door-to-door visits and presentations in schools.
2. Regularization – replacement of the distribution system, installation of new service drops and meters for the new (or returning) customers, and the start of billing and collections. Includes installation of anti-theft cables, remotely controlled meters, and efficient transformers.
3. Post-regularization – hosting community campaigns as well as working on an individual basis with the new customers to improve the efficiency and affordability of their electricity use. Distributed new efficient lights. Poorest households received refrigerator replacements. Households with the riskiest internal electrical wiring received upgrades of internal wiring including safer and somewhat more efficient electrical showers. Initially, bills were capped at 150 kWh for a period of at least 3 months. Commercial customers were visited to identify efficiency measures that would be cost-effective for them to take. Additional public lighting improved the overall ambiance and personal security of the community (USAID, 2009, p. 1).
4. Evaluation – a consumer poll to test changes in attitudes and satisfaction with the results of the project from customers' perspective. Financial analysis of the results from the perspectives of the company and the consumer (USAID, 2009, p. 2).

Table 1 below provides a summary of the accomplishments of the SELR programme.

**Table 1: Main Project Outputs**

| Measure                                     | # installed or completed |
|---|--------------------------|
| Primary distribution system upgraded (km)   | 2.98                     |
| Secondary distribution system upgraded (km) | 5.4                      |

|  |       |
|--|-------|
| Transformers replaced (conventional/efficient)   | 6/12  |
| Conventional meters and posts installed  | 3,890 |
| Electronic remote-controlled meters installed  | 475   |
| Pre- or post regularization door-to-door visits by community agents                                  | 8,594 |
| Community and school events  | 27    |
| Replacement of inefficient light bulbs with compact fluorescents (CFLs)                              | 9,588 |
| Refrigerator assessments completed   | 2,598 |
| Inefficient refrigerators replaced with PROCELA-rated ones   | 496   |
| Wiring safety assessments completed  | 2,433 |
| Household rewiring and replacement of electric shower  | 497   |
| Replacement of individual outside lights with public lighting (472 in alleys and 33 in main streets) | 505   |
| Commercial audits and recommendations made   | 70    |

One of the important elements that ensured that the programme would initially be a success and overcome the economic barriers to implementation was the waiving of the registration and installation fees by the programme. This ensured maximum community participation, as well as reduced the risks of fires caused by unsafe connections and guaranteed that appropriate metering systems would be installed to monitor electricity consumption at the source. Overall, “These energy efficiency and safety measures combined with the ‘regularization effect’ reduced consumption in the targeted 4365 households and commercial entities from an average of 250 kWh down to 151 kWh per customer for a reduction on average of 40%.” (ibid, p. 2). The company was also able to increase its collections from billed customers thereby increasing revenues. They were also able to collect applicable tariffs from the government which also improved their revenues. This case study is applicable to understanding the partnership between the JPS and the JSIF in an attempt to reduce loss for the company, while promoting affordable energy and social inclusion.

#### **The Partners**

“Electricity underpins the Jamaican productivity sector and is one of the largest contributors to the GDP of Jamaica. It is integrally linked in every facet of national development. It is estimated that there are 180,000 illegal consumers of electricity in Jamaica. This represents approximately a third of all customers” (JPS-JSIF, 2016, p. 3). This indicates that for approximately 20% of Jamaica’s population (540,000) who live in 700 informal communities, paying for electricity is a major challenge (Mitchell, 2016a; Shiva, 2015; Sticzay & Koch, 2015). However, it is a necessary component to life and security. Consequently, the JPS has been called upon to commit their resources to ensure that residents not only have access to legal electricity, but also that they are trained, and certified in various skills in order to maintain the integrity of the electricity systems as well as be able to pay for the energy that they consume. The following section provides some background to the organizations involved, and additional reasons for their involvement in the CRP (Mitchell, 2016a; CRP-PIOJ, 2013).

#### **The Jamaica Public Service Company Limited**

JPS is the sole distributor of electricity in Jamaica. We are the proud inheritor of a tradition that dates back to 1892, when Jamaica first received electricity. This placed Jamaica in the enviable position of being one of the first in the world to have electricity, and only thirteen years after American scientist Thomas Edison had invented the electric lamp. In that year, the first electricity service in the island was supplied by the Jamaica Electric Light Company from a plant at Gold Street, in Kingston” (JPS, 2016a, Our History).

The JPS is registered under the Companies Act of Jamaica to generate, transmit and distribute electricity throughout Jamaica according to the *Electricity Licence*, 2016 and the *Electricity Act* (Jamaica Public Service Company Ltd. (JPS) & Jamaica Social Investment Fund (JSIF), 2016, p. 2). Its mission is “Through inspired and committed employees and innovative technologies JPS will deliver an energy solution for every Jamaican – improving lives, fueling the growth of businesses and empowering the development of Jamaica” (p. 2). The Company has successfully increased its customer base since Jamaica gained Independence in 1962. In 1966, “JPS had 3,928 customers, a far cry from today’s customer base of over 585,000. JPS was granted an all-island franchise in 1966, and today remains the sole public supplier of electricity” (JPS, ibid). The Company has changed owners several times throughout its history and undergone privatization. The JPS is currently owned by three shareholders: 20 per cent by the Government of Jamaica (GoJ), and 80 per cent jointly owned by the Marubeni Caribbean Power Holdings (MCPH) Inc. (a subsidiary of Marubeni Corporation of Japan); and, the Korea East-West Power Company Ltd (JPS, 2016a).

The JPS has 4 main power stations in St. Andrew (Rockfort), Kingston (Hunts Bay), St. Catherine (Old Harbour Bay), and St. James (Bogue); eight hydro-electric plants, and one wind farm, which produce “electricity

using the following technologies: steam (oil-fired), gas turbines, combined cycle, diesel, hydropower and wind” (JPS, 2016b, Power Plants). Since 2009, JPS has invested more than J\$6.5 billion on plant maintenance to ensure greater efficiency in performance (Sweeney & McDonald-Watson, 2014, slide 8). Additionally, they spent J\$13.5 billion to improve the power delivery network. The outcome is fewer and shorter power outages (slide 9). However, research has shown, for Jamaica, and the region, that losses continue to increase (Lerner, 2014).

JPS continues to incur losses in spite of spending “up to US\$30M each year to fight theft. In the last 5 years, JPS was not allowed to recover approximately US\$100M in fuel costs” (Sweeney & McDonald-Watson, 2014, slide 6). Understanding the gravity of the problem is critical to sustaining a partnership in community renewal, particularly in training and certifying community residents through technologically assisted methods. Reports from the CRP-PIOJ (2013) indicate that

Each 1% of theft of service results in US\$8M in fuel that can't be recovered through billing. Today, billed customers pay for the 1st 7.5% of Losses (i.e. it is embedded in the existing fuel tariff) and JPS pays for the excess. The theft of service (non-recoverable) today is approximately 15%, which means it is costing Jamaica approximately US\$120M p.a. in wasted foreign exchange that is being utilized to purchase fuel for non-paying users of electricity (p. 3).

With an annual growth rate of 0.80% and a debt burden that is close to 133% of GDP (Trading Economics, 2016), Jamaica cannot afford any more losses in the power sector, neither can it afford to have almost 20% of the population without access to legal electricity. Research funded by the JPS in 2009 indicated a significant correlation between “the level of NTLs and the socio-economic conditions of the country. The objective of the study was to determine to what extent did the socio-economic variables (that are outside of the control of the utility) explain the level of NTLs measured as a percentage of low voltage sales” (ibid, p. 3). From a survey of 63 utility companies across the Latin America and the Caribbean region, researchers concluded that 85.5% of the variability in non-technical losses (NTLs) could be explained by three main socioeconomic variables. They are: “(i) the proportion of the population living in extreme poverty; (ii) the average annual electricity bill as a percentage of income per capita; and (iii) murder rate per capita (a proxy to measuring the propensity to commit violent crimes or steal)” (ibid, p. 3). In communities where electricity theft is a persistent problem, even if consumers had the will to pay for their consumption, the JPS, nor the Office of the Utility Regulators (OUR), had no short-term plan or regulatory framework that would “allow a distribution, and customer on-boarding system that will serve the needs of the community” (Sweeney & McDonald-Watson, 2014, slide 1). However, the JSIF had a plan.

### **The Jamaica Social Investment Fund**

Since 1996, the JSIF has been a strategic part of the Government of Jamaica's (GoJ) fight against poverty. Under the Company's Act of Jamaica, it was established in 1996 as a limited liability company. Its mandate is to channel resources to community-based projects (JSIF, 2011; JSIF, 2016a, 2016b; Mitchell, 2016b). The Fund's projects generally fall into one of four categories, that is, (1) Social Infrastructure; (2) Economic Infrastructure; (3) Social Services; or, (4) Organizational Strengthening (JSIF, 2011; JSIF, 2016a, 2016b; Mitchell, 2016b). The contribution of JSIF's work to sustainable development in Jamaica is significant. Thirty communities are currently being served by the Fund. Residents are actively engaged in community development to empower themselves and others. They provide critical infrastructure through building new schools, or rehabilitating and expanding old ones in underserved communities. Recognizing the needs of the rural population, the Fund also assists with the rehabilitation of farm feeder roads, increased access to water, improved sanitation for schools, and the provision of agricultural equipment for farmers, while accessing markets for their produce through promoting community tourism (Mitchell, 2016b). At the Denbigh Agricultural Show 2016, the Fund also exhibited their investment in skills training, under the theme, “Youth in Technology. The training of these youth are conducted in partnership with the Professional Development Institute (PDI), the University of the West Indies Film Project, and the University of Technology's Community Services Department (ibid).

Specific to the problem of access to legal electricity, the Fund has been committed to ensuring that persons living in poverty are afforded access to basic services through the Inner City Basic Services for the Poor (ICBSP) funded by the World Bank (JSIF, 2013). The ICBSP is “a wider social development intervention which sought to improve access to service, both public and private as well as building the social capital within communities towards enhanced social inclusion” (JSIF, 2013, p.1). Since this programme began in 2008, it has been committed to providing services to communities falling within quintiles 1 and 2 (PIOJ, 2012). As part of this expansive programme, a small pilot for electricity regularization was introduced for three communities. The report indicated the following:

Given the socioeconomic losses caused by electricity theft and the safety hazard posed by illegal connections, the ICBSP sought to regularize the electricity supply for some residents within its target communities. The electricity regularization projects carried out by the Jamaica Social Investment Fund (JSIF) involved the wiring of houses,

inspection for Certification by the GEI, and the regularisation of these accounts with the Jamaica Public Service Company Ltd (JPSCo). JSIF, JPSCo and the Rural Electrification Programme Ltd. (JSIF, 2013, p. 3).

The communities selected for the pilot were Bucknor in Clarendon, Central Village in St. Catherine, and Lauriston in St. Catherine. At a cost of US\$260,000, 289 units were wired in Bucknor (70% coverage) and in Central Village (90% coverage); with approximately 130 obtaining contracts with the JPS by the completion date. No work was carried out in Lauriston, as overhead distribution power lines were required before any of the 124 units identified could be certified by the Government Electrical Inspectorate (GEI) (JSIF, 2013). To follow-up on the work already started, and to expand the scope, the JSIF readily partnered with the JPS.

## II. METHODOLOGY

### Community Selection

For the JSIF, the communities selected to participate in the Community Renewal Project are pre-selected (Mitchell, 2016b) as the most critical and having the highest degree of loss due to electricity theft. All the communities fall within quintiles 1 to 3 based on the Planning Institute of Jamaica's (2012) economic index. Communities are also granted priority service based on how rural they are, the poor or unavailable levels of social services that exist, and the high crime rates. Additional features of the JPS selection criteria include the following:

- High crime rate to include murders
- Gun culture resulting in the proliferation of firearms in all the adjacent communities
- Involvement of persons in organized crime at the local level
- Extortion racket
- Political polarization which is rooted in garrison politics
- Donmanship which seeks to entrench dons in communities
- Proliferation of gangs in most of the adjacent communities
- Squatting and the squatter mentality
- Erosion of social values
- General lawlessness and hooliganism
- Urban decay
- Heavy use of illegal drugs (Sweeney, 2014, slide 3).

In collaboration, the JPS-JSIF Team first selected seven communities to pilot the STEP UP Project described below. Soon, the number was increased to ten. The communities are "McGregor Gardens, Denham Town, Bay Farm, Arnett Gardens, Whitfield Town, Payne Land, Russia, Retirement, Ellerslie Garden and Majesty Gardens" (JPS & JSIF, 2016a, p. 4).

### The RAMI System

Since 2010-2011, the JPS has been employing innovative technology to combat electricity theft. This led to the introduction of the Residential Automated Metering Infrastructure (RAMI) system (Lobban, 2011). Meters are installed in remote places away from the customer's premises. For example, in meter enclosures on electricity poles or attached to transformers. It is connected to a Customer Display Unit (CDU) in the home. This CDU records and displays the consumption being recorded on the remote meter. JPS reads the meter remotely employing Powerline Communication (PLC) technology. Service can also be disconnected and reconnected remotely. Their design makes them appropriate for "operationally difficult communities" such as the volatile communities served by the JSIF. In 2015, the JPS found the RAMI system to be so effective at reducing losses as a result of theft that they committed another J\$87 million to expand the project (Lobban, 2015).

### The STEP UP Project

The STEP UP Project represents a joint JPS funded agreement between the JSIF (representing the government of Jamaica) and the JPS. It is targeted at the delivery of infrastructure, services, and civil works, relevant to the provision of legal electricity connections in the pre-selected pilot communities (McGregor Gardens, Denham Town, Tower Hill, Arnett Gardens, Whitfield Town, Payne Land, and Majesty Gardens), as well as skills training and employment opportunities for community residents.

After a launch in July 2014, the project began on November 18 2014, through a partnership MOU between both entities. To achieve the objective of regularization, the project is broken into key components namely: (1) Skills Training, (2) Infrastructure, (3) Community Facilitation, and (4) Light Bulb and Refrigerator Gasket Swap. The Infrastructure component involves the wiring and certification of households in the communities of McGregor Gardens, Majesty Gardens, and Whitfield Town.

Details of the implementation indicate that:

- The intervention will primarily utilize the following mechanisms, to create a holistic, integrated and synergistic approach to behaviour modification and a reduction in NTLs in the pilot community;
- Energy education and social marketing;
- Sessions with participating community residents to, inter alia;
- Discuss potential obstacles to bill payment and brainstorm community-based solutions;
- Discuss individual and community benefits of utility bill payment;
- Explain how the billing process works;
- Go through average power usage for common appliances of varying ages and conditions;
- Assess likely energy usage of residents' current appliance structure;
- Wiring of houses, using community labour;
- Training of community electricians through on-site certification (through partnership with HEART/NTA), with supervision from JPS Engineering Unit;
- Provision of basic entrepreneurial training to help trained electricians distinguish themselves in the market and begin to earn money;
- Reduction in bureaucracy involved in 'getting legal';
- Facilitation of GEI certification for properly wired houses
- JPS sign-up fairs to get meter" (Sweeney & McDonald-Watson, 2014, slide 13);
- "Additional service plan options;
- Pre-paid metering;
- "Budget Billing" with reminder SMS messages at 50%, 75% and 90% of budget usage;
- Light bulb swaps and refrigerator door seal replacement;
- Initiatives to reduce the electricity costs of the participants;
- Provision of additional distribution lines and/or infrastructure as necessary to allow for adequate power supply to participating community residents;
- Strengthening of community capacity to manage future development projects;
- Technical co-operation in project management through community-driven development processes: JSIF will work with community groups to provide technical assistance and hands-on project implementation experience;
- Visibility activities to enhance wider community awareness of the intervention, its goals and its successes." (Sweeney & McDonald-Watson, 2014, slide 14).

#### **The Ready Board Project**

The JSIF-JPS partnership has been so innovative in their approach to reducing losses to the JPS as a result of theft and enhancing social inclusion that they have launched the Ready Board Project. This is specifically designed for wooden houses or other dwellings where the infrastructure is so dilapidated that they cannot receive conventional wiring. Ready boards are total electrical installation done on a specialized piece of ply (Jones, 2015). It is an integrated approach to make electricity affordable and clean for the consumer, requiring the RAMI system, ready boards, and prepaid services. One potential recipient in Majesty Gardens reacted positively to the regularization process. He said, "A long time wait on this. We have to just adjust ourself to things," Davis said. "It cost us less than if we were not paying bills, because sometimes our things burn up because the illegal thing no straight. So it will be better. If they set a nice little flat rate I think it will work" (Jones, 2015).

### **III. RESULTS**

The projects are still in the developmental stages. However, they are significantly developed from the initial pilot projects. The following presents the results of the STEP UP Project which is the joint effort of the JPS and the JSIF, and also consumption data of the newly regularised customers from January to August 2016.

The following section presents the progress report of Dane Mc Lean, Project Officer at the JSIF with primary responsibilities for the JSIF-JPS partnership.

The McGregor house wiring was completed with 200 houses wired and on-boarded; Majesty Gardens have 251 houses wired, with 102 on-boarded to date and Whitfield Town with 150 houses wired and 50 on-boarded.

The Skills Training component has seen four trainees recruited from McGregor Gardens, with two of the trainees currently on track to complete Level 11 Certification in Electrical Installation by January 2016. One trainee did not meet the requirement for assessment, while the other requires remedial support.

The Community Facilitation component has seen the recruitment of 10 community based facilitators within the project communities. These include one for Majesty, Payne Land, McGregor Gardens, Bay Farm, and two

persons for Denham Town, Arnett and Whitfield Town. The facilitators provide door to door visits, sensitizations sessions, energy audit and related sensitizations, and arrange meetings for customer contact with JPS within the communities. To date the facilitators have arranged 24 meetings with community stakeholders, visited over 2645 homes, facilitated over 800 customers to be regularized.

The Bulb Swap and Refrigerator Gasket Swap component has to date seen the donation of 2000 bulbs by UTech to the project. 400 of these have been distributed in the McGregor Gardens community following the conclusions of house wiring. The refrigerator gasket component has not been implemented.

#### IV. COMPONENTS AND ACHIEVEMENTS

##### Infrastructure - House wiring

**Targets:** 600 houses wired and Certified in McGregor Gardens, Majesty Gardens and Whitfield Town

**Table 2: House Wiring**

| Communities      | # Houses assessed by JSIF | # Houses Wired | # New connections to JPS Grid |
|------------------|---------------------------|----------------|-------------------------------|
| McGregor Gardens | 200                       | 200            | 200                           |
| Majesty Gardens  | 250                       | 250            | 102                           |
| Whitfield Town   | 150                       | 151            | 50                            |
| <b>Total</b>     | <b>600</b>                | <b>601</b>     | <b>352</b>                    |

##### Community Facilitation

##### Targets

- 14 facilitators to be hired to service community service centers
- 2000 Houses visited in the seven target communities for regularization
- 21 Community meeting in all seven communities
- 1200 houses assessed for recertification
- 2,000 customers overall being regularized

**Table 3: Community Facilitation**

| Communities      | # houses visited by Facilitators | # of Community meetings completed | # Houses submitted for GEI Certifications | # Household submitted for payment Plans |
|------------------|----------------------------------|-----------------------------------|---|---|
| McGregor Gardens | 218                              | 10                                | 0   | 0                                       |
| Whitfield Town   | 548                              | 2                                 | 68  | 200                                     |
| Arnett Gardens   | 255                              | 3                                 | 75  | 150                                     |
| Denham Town      | 450                              | 3                                 | 50  | 130                                     |
| Payne Land       | 544                              | 2                                 | 77  | 91                                      |
| Majesty Gardens  | 360                              | 3                                 | 0   | 0                                       |
| Bay Farm Villa   | 270                              | 1                                 | 15  | 37                                      |
| <b>Total</b>     | <b>2645</b>                      | <b>24</b>                         | <b>285</b>                                | <b>608</b>                              |

**Nb. The project hired a total of 10 facilitators for the project to date**

##### Skills Training

**Targets:** 4 Trainees trained and certified

**Table 4: Skills Training**

| Community        | # Trainees enrolled | # In training |
|------------------|---------------------|---------------|
| McGregor Gardens | 4                   | 2             |
| <b>Total</b>     | <b>4</b>            | <b>2</b>      |

##### Light Bulb and Refrigerator Gasket Swap

**Targets:** 4,000 bulbs distributed

155 gasket are scheduled to be replaced (was not implemented)

**Table 5: Light Bulbs**

| Communities      | # Bulbs allocated | # Light distributed |
|------------------|-------------------|---------------------|
| McGregor Gardens | 400               | 400                 |
| <b>Total</b>     | <b>400</b>        | <b>400</b>          |

Reports of energy consumption from January 2016 to August 2016 provided by Katherine Archie of the JPS (2016c), indicate that there are mixed results as per the energy delivered, billed sales, and the percentage of losses. Two communities have continued to trend down in losses. They are Whitfield Town (77.81% to 50.20%)

and Payne Land (86.80% to 60.38%). Others have fluctuated and in some cases returned to average levels of loss. These are Denham Town (92.23% to 92.71%), Bayfarm Villas (26.84% to 28.51%), Arnette Gardens (72.48% to 67.82%), Majesty Gardens (77.74% to 77.31%), and Maxfield (88.05% to 84.93). Only McGregor Gully seemed to show a significant increase in consumption over the period from (75.94% to 88.19% ; the lowest was 69.35% in March).

## V. DISCUSSION

All indicators continue to show that the only way forward for sustainable economic and social development in Jamaica is through committed partnerships for community renewal. The JPS-JSIF partnership has already begun to show economic benefits for the JPS and the communities as legitimate customers who have benefitted from house-wiring, training, and light bulb replacements, become paying customers. Community facilitation has ensured that all stakeholders remain engaged in the process, and are aware of what project components are working well and what components are not. The level of poverty in these communities makes it imperative that social development accompanies the infrastructural development.

Reports indicate that the first phase of implementation of the Project was completed in early 2016. In terms of the four areas targeted, (1) Skills Training, (2) Infrastructure, (3) Community Facilitation, and (4) Light Bulb and Refrigerator Gasket Swap, the preceding results show that the partnership is progressing. In combination with previous interventions of the anti-theft RAMI system, Whitfield Town and Payne Land understandably show the most significant improvements in minimizing nontechnical losses to the JPS. With more investments like these, as well as continued community facilitation and training, it is anticipated that McGregor Gardens, Arnett Gardens, and Denham Town will show similar improvements in the future. Majesty Gardens continues to be a challenge as residents also have ready boards specially designed for the dilapidated dwellings. Facilitators are aware that these residents not only continue to access the JPS grid, but also obtain energy from their neighbouring industrial customers.

However, the benefits that are accruing to the residents suggest that a long-term investment will have significant rewards to residents, and to the JPS. The benefits to residents begin from the decision is made to invest in rewiring their homes. The waiting period for certification is reduced as the JPS-JSIF partners' work together to assess the needs, acquire necessary equipment, and provide the expertise for installation and certification. JPS also provides new, higher voltage capacity transformers to accommodate the increased numbers of persons on the system, so a low level system designed for 10 households no longer serves 40 households. Rather, a transformer is installed with the capacity to supply at minimum 40 households, with the capacity to generate more power as more households are connected to the service.

The successes celebrated by the JSIF are having their clients become legitimate consumers of electricity that they use. Proper documentation also affords them access to other services that had previously been denied. Such services would require a utility bill showing proof of address. With a simple bill generated in the householder's name, with the address, access to financial institutions, credit arrangements from major appliance stores, and more suddenly become available. This gives them a competitive advantage in educational, economic, and social enterprise.

The benefits to the power company can also be significant as their losses from electricity theft are reduced by the number of and payment of users who become legally connected to the system. The JPS also benefits from not having their equipment be destroyed, tampered with, or vandalized in any way because people are now legitimately accounted for in the system.

### **Limitations and Future Research**

One of the major limitations of this study was an inability to map the specific areas where energy is being consumed because meter points are not established in all the relevant locations. Future research can address this problem through an evaluation of the JPS meter points. Future research can assist the JPS in knowing the most strategic places for the meters where they will not be tampered with, as well as monitor the energy consumed via those meter points.

Another limitation of the study related to not having an assessment of attitudes towards paying for electricity for the customers who have been regularized. Articles by Jones (2016) and Lobban (2011) indicated that the anti-theft measures were effective in a variety of areas. However, the attitudes of the residents towards paying for electricity seemed to be mixed. In agreement with previous research (USAID, 2009) residents were surprised at the bills they received reflecting their consumption levels. Their cry was for the JPS and the Government to do something for the poor people (Jones, 2016). However, there were others who considered the regularization a blessing as being legal they could have a safer connection to the grid, and their appliances would no longer be destroyed by high voltages. Future research needs to understand the psychology of these residents towards paying for electricity

in order to understand the critical areas for intervention. Such as capping the electricity consumption to what they can afford for the month, or if a welfare approach is what is expected from the majority of illegally connected consumers.

Future research could also evaluate the impact that government subsidies and a designated social fund would have on electricity consumption, community renewal, and also Jamaica's GDP. The cost of oil as the source of energy is astronomical to a SID like Jamaica. However, establishing a policy which allows J\$5 of every J\$100 worth of energy that is consumed to be contributed to a fund to pay for the welfare benefits for person on the PATH programme, would benefit JPS and the country. At a minimum, the JPS would know that they have to supply 300kw hours of electricity per month to 40 regularized households who receive PATH energy benefits, versus the current situation where they are supplying 100kw hours for 10 regularized households, and 30 unregularized households whose consumption is not measured. At least the JPS could improve their management and planning processes in order to reduce their losses as a result of damaged equipment and unexpected increases in operational costs.

Future research also needs to consider the commercial customers who face additional economic costs not borne by householders. Previous research has shown that businesses, once regularized, have ceased to operate because they cannot afford the electricity bill (USAID, 2009). There are several known cases in Jamaica where businesses have ceased to operate as a result of being regularized, such as a popular farmer's market. However, there are also cases of businesses that have been making use of the prepaid services offered by the JPS and managing to meet their expenditures, such as a music studio. Research could assist practitioners in training programmes and appropriate metering, billing, and collection systems that would protect commercial clients, and increase the JPS' revenues from new clients.

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