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★ ENERGY INSECURITY: A CASE STUDY OF ELECTRICITY OUTRAGE AND MICRO-ENTERPRISES MANAGEMENT IN MINNA METROPOLIS.

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ENERGY INSECURITY: A CASE OF ELECTRICITY OUTAGE AND MICRO-ENTERPRISES MANAGEMENT IN MINNA METROPOLIS

MOHAMMED, BALA BANKI*

ABSTRACT

At the centre of all human activities is the application of energy. In deed activity itself is a function of energy, for without application of energy, the intended activity may not hold. Energy is not only important for development, it is also important for the improvement of the welfare of the people. Modern economy is energy-driven and the high consumption level of the society is also energy-dependent. For any economy, energy must be present in sufficient amount at all time and in all places. At the level of households energy is necessary for domestic activities including cooking, heating, cooling, preservation of food and even for leisure and entertainment. One of the basic commodities of the modern time is information. Information is dependent of energy, where the supply of modern energy is either absent or inadequate or irregular, information flow will be hampered. In all dimensions therefore energy contributes to economic development, household economy and welfare and forms the backbone of the information flow throughout the world. Energy is essential to life and its development has shaped human society and civilization (Reddy et al, 1997).

Key Words: Energy, Economic Development, Microenterprises, Urban economy, Poverty alleviation.

INTRODUCTION

Successful small businesses (micro-enterprises) are the primary engines of economic development, income growth, and poverty reduction in most of the developing world. These businesses can also build foundations for stable communities, civil society, and gender equality. However, poor infrastructure, weak public services, and lack of access to markets and formal financing remain major impediments to small business growth.

Micro-enterprises refer to a very small business that produces goods or services for cash income (Allerdice and Rogers 2000). They operate in the informal sector of the economy, require little in the way of initial start up capital and have few employees, usually defined as less than ten (CBS et al, 1999). It includes Street vendors, carpenters, machine shop operators, peasant farmers. micro-entrepreneurs come in all types, and their businesses in many sizes and this diverse group requires a variety of support to grow and improve. In many countries, microenterprises constitute the majority of businesses. They account for a substantial share of total employment and gross domestic product (GDP), and they contribute significantly to the alleviation of poverty. They are often the chief economic defence of the most vulnerable households in high-risk environments, such as civil conflict, or during natural disasters. As the predominant source of income and employment for hundreds of millions of people worldwide, the microenterprise sector's influence on individuals, households, and national economies is clear and profound.

Modern society demand profuse power supply and power security, which plays a decisive role in social stability and efficacy in the operation of any economic. Power supply is at the heart of all forms of development; in particular the life blood of economic development. Availability of power affects the quality of everyday life, from mundane matters like keeping cool during the heat to preserving food in the refrigerator. Unfortunately, the administration's mismanagement of the power sector since 1999 is worrisome. The country suffered knockout punch by the Power Holding Company of Nigeria (PHCN). PHCN through its Public Affairs unit in 2009 informed the country that power generation dropped again by almost 60 per cent from over 3,000MW to below 1,500M. Energy Analyst lists the challenges of the energy sectors as: lack of operating space, low tariffs, poor revenue collection, and inadequate gas supply and energy losses. None of these are news to Nigerians who have been treated to the same litany of problems and reasons for several generations. Perhaps more troubling is the fact that we have 14 generating plants in the country, three based on water power at Kainji, Jebba and Shiroro and eleven based on thermal application of gas. Coal plant at Uji River seems to have been discontinued. Currently, the combined output is below 4000 MW of electricity

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which is less than half of the installed capacity. This if measured against an estimated daily demand of 10,000 MW according to many sources put the future of the country in bleak. For many years, there have been uncertainty concerning what we really need in terms of power generation and also the country has experienced neither the comprehensive maintenance of its existing power generating nor the construction of new plants in the previous 20 years.

In Obasanjo's administration, It is said that between \$ (US) 10 billion and \$ (US) 16 billion was spent in a two prong effort on the power sector from 1999 to 2007(National Assembly, 2008). But, the results on "the street" have been less than encouraging as power outage is on the increase. This make doing business in Nigeria expensive; a causal reason for the fold up of small business enterprises in the country. As what appear to be a giant stride in repositioning the power industry in Nigeria, Power generation was deregulated and licences issued to private sector investors and none of which came on line during the plan period. Because of this lukewarm response, government had to step in again with the National Integrated Power Project (NIPP) to generate power. Three thermal plants were underway at Alaoji in Abia State; Egbema in Imo State and Gbarieubim in Kwara State. Four hydroelectric projects were started in the Mambila Plateau. None of these seem anywhere near beginning to deliver power to the grid. The National Assembly investigation aimed at verifying the amounts spent and for what is showing clearly that good intentions are never enough, there has to be a will and commitment to deliver on the intent.

A Vanguard Newspaper supplement of August January 28, 2008 captured the ugly situation of power under the theme, "Driving the Nigerian Economy on Power Generators." The picture painted is bleak. The paper estimate gives an expenditure of fuel for generators at 16.4 trillion (1 trillion here being 1012 as is in the USA and France rather than 1018 as in some other countries) as shown in table 1. The manufacturing sector according to a report cited in the Vanguard supplement, has shrunk from 8.4 per cent in 1980 to less than 4.5 per cent in 2005. In short while other countries are surging ahead we are surging backwards.

Table 1: Estimated Annual Expenditure on Fuelling Generators

S/N	Economic Sector	Number of generators in millions	Amount ₦ billion
1	Telecommunications	40	6,700.00
2	Petrol Filling Stations	8,671	43.93
3	Industries	2,446	191.08
4	Banks	4,625	11.70
5	Insurance Companies		
6	Residential	60	7,812.00
7.	Commercial Enterprises	5	1,570.00
	Total	8,671	16,330.99

Source: Financial Vanguard (Supplement in Vanguard).Monday, January 28, 2008 p A2

This paper therefore, assesses energy insecurity: electricity outage vis-à-vis the micro-enterprises activities in Minna metropolis. It assesses the extent to which poor/irregular electricity supply affected microeconomic activities. The business categories would be emphasised for selection on the basis of significant performance and use of technological inputs and energy demand. The categories (and their technological inputs) were the following: hairdressing (hair dryers, hair steamers, rollers, ring boilers, and electric fans); dressmaking/tailors (sewing machines, finishing machines, electric irons,);laundries (washing machines, electric irons,);food processing (food-processing mills, cold rooms);cyber cafes (internets, computer centres, computer repairs, and training)and apprentices(welder,alumium work, casting, etc).

LITERATURE REVIEW

Modern Energy As A Catalyst For Micro-Enterprise

Reviewed literature demonstrates that access to modern energy is a necessary but not sufficient condition for the start-up and development of micro-enterprises. Another key finding is that, while lack of modern energy is often characterized as a barrier to micro-enterprise development, removing this barrier (through, for example, energy development such as (rural) electrification) does not necessarily result in micro-enterprise development. In other words, access to modern energy is neither the only nor even necessarily the most important factor influencing micro-enterprise development. Other factors such as access to finance, markets, and other infrastructure are also very important.

Support for the notion that modern energy can and does act as a stimulus for the emergence, growth and continued development of micro-enterprises is relatively strong in the literature reviewed (Karekezi and Majoro, 2002). Fakira (1994 cited in Meadows, et al 2003), for example, claims that "energy is one of the critical resources needed to liberate micro-enterprises from low value, low productivity and low income activities." Allerdice and Rogers (2000) suggest that "access to even limited amounts of electricity for micro-enterprises in non-grid-connected areas can be important to the establishment and growth of those businesses."

Khan (2001) demonstrated the significance of better lighting for increased income-generation attributable to extension of business hours into the evenings. The author cites examples of tailors who worked for four more hours and thereby increased their revenue by 30% in Bangladesh. Opening hours for shops were also found to increase by an average of three hours a day and in terms of new businesses, Khan concluded that adequate lighting is a "deciding factor" in whether or not people opened a home-based business. Foley's (1990) study reports increased economic activity and higher living standards following electrification and concludes that "the arrival of an electricity supply in certain areas seems to be a crucial factor in precipitating decisions by local entrepreneurs to invest in a variety of productive enterprises."

Rogerson (1997) cites evidence from KwaZulu/Natal of positive impacts of on existing SMEs that benefited from the switch to electricity including welding shops and tailors. In other sectors such as brick making and garment manufacturing, the availability of electricity determines levels of technology and also has strong influence on cost and levels of production. In Northern Province of South Africa, the contrast between rural SMEs without access to electricity and those in electrified industrial estates is instructive. Rural SME owners indicated that lack of electricity was among the main limitations to their competitiveness while those operating in the industrial estates mentioned the presence of electric service as one of the benefits of location in the estate, in addition to other important infrastructure available there (Rogerson, 1997).

Subjective evidence is commonly used to support the argument that modern energy can and does play an important role in stimulating micro-enterprise. For example, Rana-Deuba (2001) suggests that access to modern energy produced by micro hydropower in Nepal has been found to result in or contribute to the establishment of bakeries, photo studios, battery charging, grocery stores, agricultural and saw mills and small-scale agricultural activities such as poultry farming and goat keeping. Balla (2003) reports a similar variety of SMEs established and/or expanded following micro-hydro rural electrification projects in Kirinyaga and Meru Districts of Kenya.

Dube (2001), cited in Karekezi & Majoro, 2002) suggests that the security lighting on high-masts (poles) in poor urban areas of South Africa has resulted in the urban poor setting up small enterprises in the evenings. Similarly, the Nairobi City Council in Kenya has embarked on a program to repair and install streetlights along the inner roads, walkways and slums with a view to relocating hawking businesses from the congested central business district into the outer parts of the city. Installation of streetlights has increased visibility, attracted more customers, improved security and extended the hours of operating businesses into the night, thus improving sales and profitability (Kirubi, 2005).

Several case studies from Grameen Shakti's PV program illustrate well the value of modern energy to microenterprises (Meadows et al, 2003). For example, a local appliance repair shop, using solar power to undertake repairs, was reported to increase income by US\$25 per day. A lamp-renting

enterprise which rented out 5 solar lamps earned an extra US\$12.50 a month and the operation of solar powered cellular phone system earned the owner an estimated US\$30 a day extra. Extended working hours at a local barbershop using solar lighting was found to increase income by US\$5 a day. In addition to these financial indicators, other direct impacts experienced by these enterprises included better work quality and efficiency, a better working environment and greater income from ancillary sales associated with attracting customers in the evenings. Other indirect impacts of these enterprises using solar systems were identified as greater customer satisfaction, increased income for workers, increased social status of owners and customers, increased living standards for locals and increased employment opportunities.

Nevertheless, there are conflicting reports and differences of opinion in the literature regarding the impact that modern energy can and does have on entrepreneurial activities, and hence its developmental importance. Several authors have offered explanations for these differences. One view is that modern energy is one of a number of critical enabling factors necessary for micro-enterprise development. For example, Barnes (1988) reports finding greater numbers of businesses in rural areas with electricity than those without it, but also highlights that there were other complimentary local conditions such as "ready availability of adequate credit finance and access to markets".

Another perspective is that while electricity is crucial to existing and well established micro-enterprises, it is not so much a contributing factor in the emergence of new ones. Following a literature review of international work on rural electrification, Rogerson (1997) concludes that access to electricity encourages the "modernization" of existing rural SMEs but "it exerts only a modest stimulus for the growth of new enterprises." This skepticism is echoed by Wamukonya and Davis (2001) who observed that "overall, rural electrification does not seem to have had significant impact on the growth of income-generating activities in Namibia". They note that very few home-based businesses used electricity and when they did, they mainly made use of electrical "lighting only". In their view, access to finance and markets are more important for SMEs than electricity.

Other studies strongly question the developmental value of modern energy (e.g., solar PV) that provides "lighting only" in rural areas. Karekezi and Kithyoma (2002) have observed that, while typical solar PV systems (40-100Wp) are useful for lighting in rural SMEs, they cannot meet the "heating and shaft/motive" power needs of the SMEs, which are 100-1000 times higher. PV technology, they contend, is thus unsuitable and uneconomical for *agro-processing* activities that often represent the most attractive options for generating incomes in rural areas. An FAO study (2000) cited in Cecelski, 2000) on the impact of solar PV on rural development shares this view and emphasizes the need to go "beyond the light bulb" in order to have an impact on poverty reduction. While acknowledging the limitation of solar PV as an anti-poverty intervention, Jacobson (2004), nonetheless concludes that "solar PV appears to play a *small* but potentially significant role in supporting income and work related activities in rural Kenya".

MATERIALS AND METHODS

The data for this study were collected from various sources. Field survey was carried out with structured questionnaires. A total of 250 questionnaires were administered using systematic random sampling techniques. In this case, questionnaires were administered in every 3rd shop in the selected commercial areas to represent the entire shops in the areas. Three business categories were selected on the basis of significant performance and use of technological inputs. The categories (and their technological inputs) were the following:

- hairdressing (hair dryers, hair steamers, trolleys, ring boilers, and electric fans);
- dressmaking (sewing machines, finishing machines, electric irons, and scissors);
- food processing (food-processing mills).
- Apprentices (welder, aluminium work, casting etc).
- laundries (washing machines, electric irons, and)
- cyber cafes (internets, computer centres, computer repairs, and training).

As reported in Table 2, 243 responses were coded and used for the analysis after eliminating the unusable responses.

Table 2: Survey Response Rate

Target and Response rate	Number	Percentage (%)
Total survey population	250	100
Total responses	243	97.2
Unusable samples	7	2.8
Total usable samples	243	97.2
Total coded samples	243	97.2

Note that: Total usable sample = 243/250

Source: Author's Field Survey, 2009.

RESULTS AND DISCUSSION

Socio-Economic Profile of Respondents

The Socio-Economic characteristics of samples in this study were measured by gender, age, education, marital status, income and occupation of the respondents. The summary of demographic characteristics is shown in Table 3.

From the samples collected, the respondents comprised of male (59.6%) and female (40.4%) and the average of the respondents' age was 48 years old. After recording the respondent's age, the result showed that 33.3% of them ranged between 41 and 50 years, followed by 26.8% of them ranged between 51 and 60. While 12.4% are ranged between 31 and 40 years and 9.0% of the respondents are less than 31 years old. From the result, majority of the respondents were middle aged (55.7%), between 31 and 50 years. The middle aged constituting majority of the respondents are an indication of an economically productive labour force that when supported can contribute towards socio-economic development.

Educational level wise, the result showed that 4.9% of the respondents had Qur'anic education, 60.1% had a secondary school certificate education while 17.4% had primary school certificate 11.7% of the respondents had degree certificate whereas 6.9% are illiterates. The educational level of the respondents therefore showed majority (89.2%) have acquired either formal or informal education and that only 10.8% are illiterate. This finding implies that with little re-orientation they can easily learn and adapt to new discoveries on how to mitigate the effect the facility insecurity on their business entrepreneur.

In terms of marital status, 37.9% are married while 34.6% are single and others (27.5%) are either divorced or widowed. The high proportion of married population can be attributed to the fact that tradition and culture of majority of the respondents whom are Muslims marry early and can marry up to four wives. The implication of this situation is that higher birth rate which would lead to increase in the total population is anticipated in the future.

Occupational structure wise, 59.1% are civil servants, while 50.2% are both private worker. Only 5.8% are students and 11.5% as traders whereas people with other jobs constitute 8.2%. Private workers are revealed as the major occupation of the respondents that are predominantly involved in small and medium enterprises. Income level of per month showed that 50.2% earn less than ₦20,000 while 47.3% earn between ₦21,000 and ₦40,000, 2.4% earn between ₦41,000 and ₦60,000 while 4.1% earn between ₦61,000 and ₦80,000. This finding is an indication that majority (89.6%) of the respondents are low income profit earning. The low earning can be attributed to the insufficient power supply which increase over-head cost due to unfavourable business atmosphere created thereby given rise to low patronages and productivity.

Table 3: Demographic Characteristics of Respondents

Variables	Frequency (N= 243)	Valid Percent (%)
Gender		
Male		
Female	145	59.6
Age	98	40.4
< 31		
31-40	22	9.0
41-50	30	12.4
51-60	81	33.3
> 61	65	26.8
Education	45	18.5
Primary school		
Secondary school	42	17.4
Graduate	146	60.1
Qur'anic	26	11.7
Illiterate	12	4.9
	17	6.9
Marital status		
Single	92	34.6
Married	84	37.9
Widowed/Divorced/Separated	67	27.5
Occupation		
Civil servant	59	24.3
Private worker	122	50.2
Trader	28	11.5
Student	14	5.8
Others	20	8.2
Income per month		
Less than ₦20, 000	122	50.2
₦21, 000- ₦40, 000	115	47.3
₦41, 000- ₦60, 000	6	2.4
₦61, 000- ₦80, 000	10	4.1
₦81, 000 above	0	0.0
Length of residence in your place		
< 5 (years)	25	10.2
6-20	200	82.3
21-35	18	7.5
36-50	0	0.0
51-65	0	0.0
> 66	0	0.0

Assessment of Electricity Supply and Micro-Enterprises Activity in Minna:

Business Type and Services

Field data analysis have shown that micro-enterprise in Minna are mostly owned by individual. Result shows that 71.3 %(173) are sole proprietors, 18.5%(45) are jointly owned, 0.8%(2) have grown to status of public liability company while 9.4%(23) exist as other form of business type(Fig.1).Result have shown also that microentrepreneurs activities in Minna offered service(F.g.2) ranging from

Laundry/drycleaning(13.6%),Metallurgical/glass/aluminumwork(30.7%),bakery/confectionaries(13.2%),internet and computer services(17.3%),milling and processing(16.9%) as well as other forms of services(8.3%).

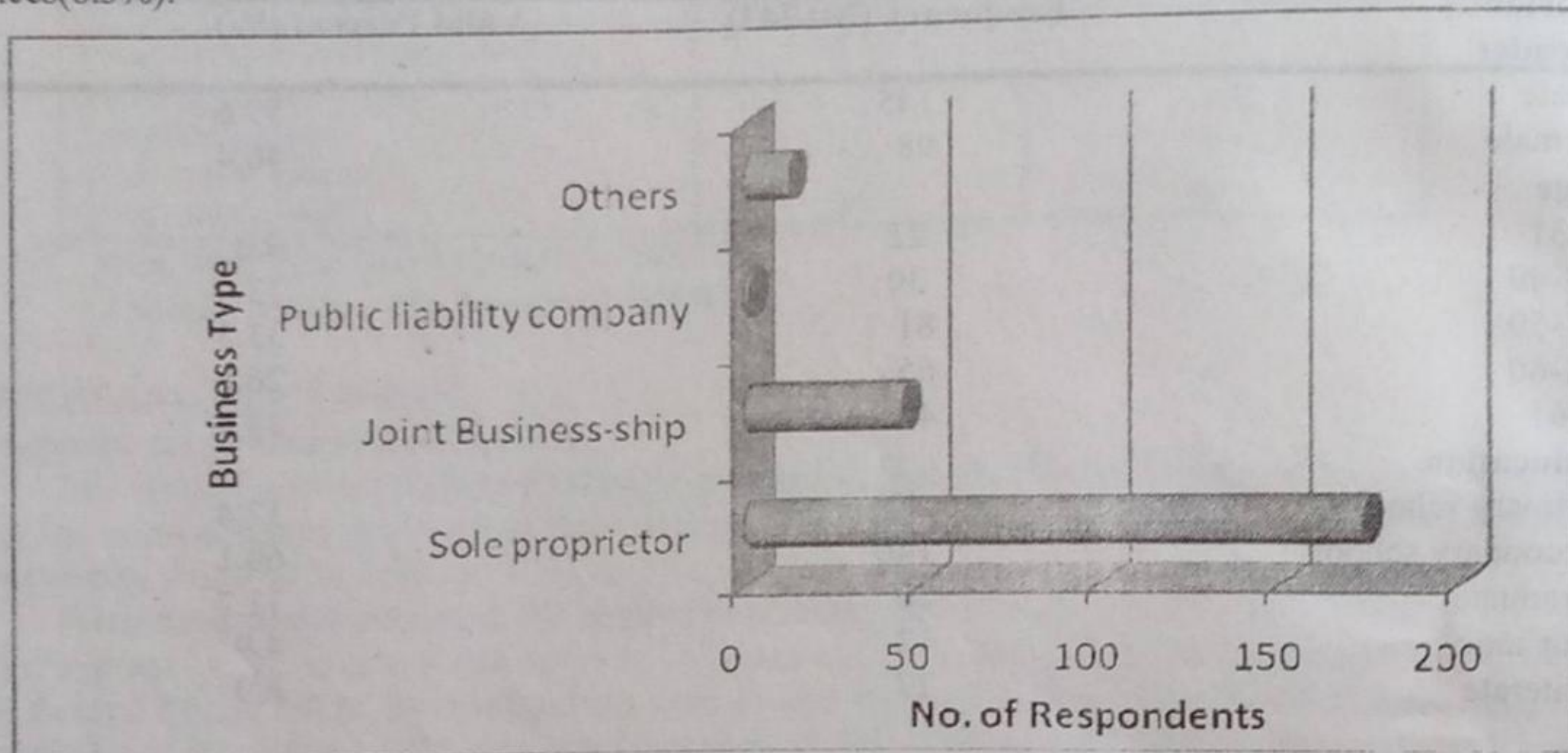
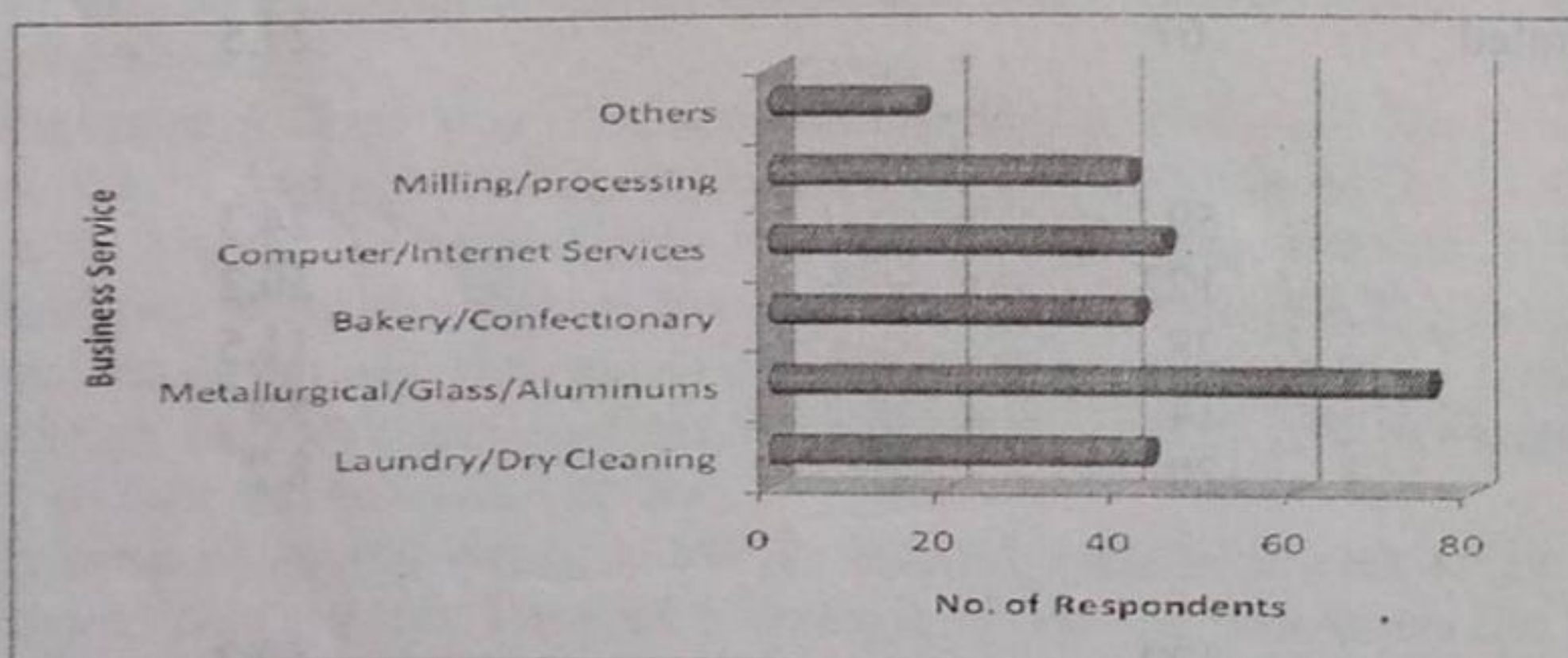


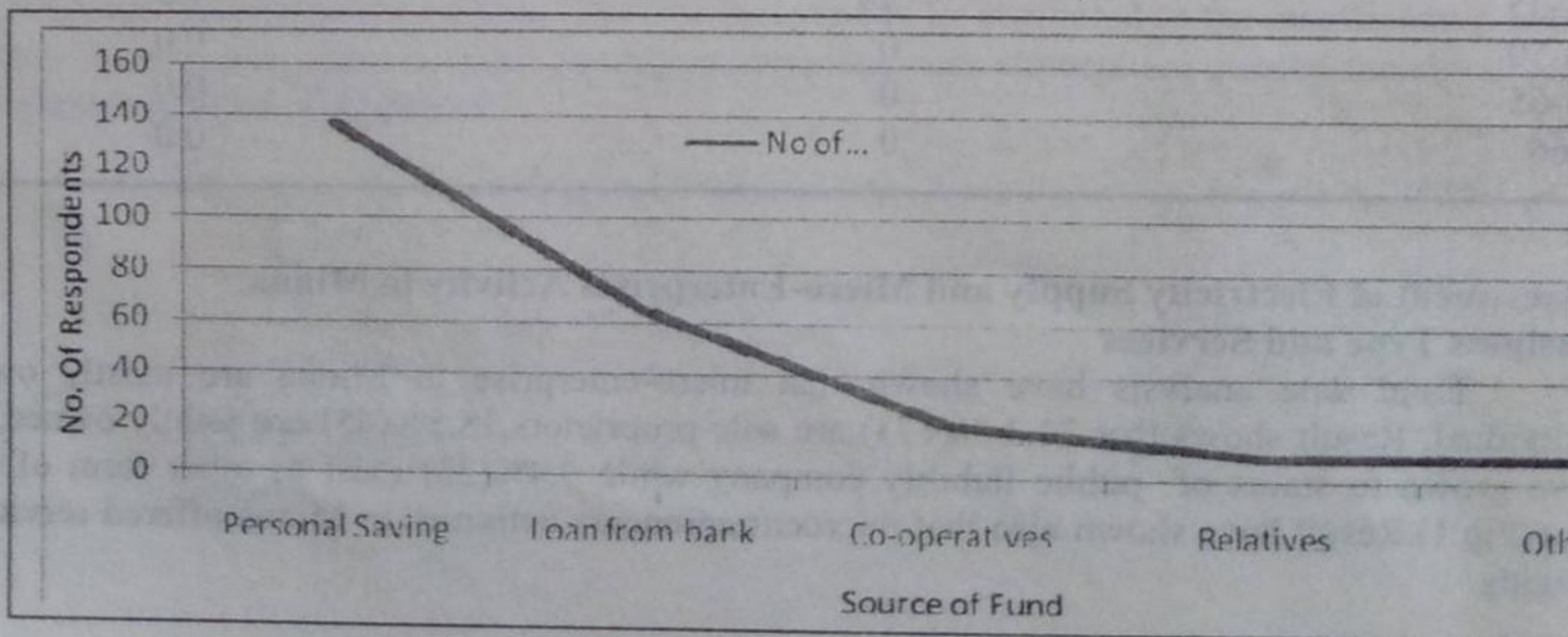
Fig.2: Micro-enterprise Service in Minna



SOURCE OF FUND FOR MICROENTREPRENEURS

A micro-enterprise small business has 5 or fewer employees and a seed capital of not more than minimum of ₦100, 000. Typically, micro-enterprises have no access to the commercial banking sector. Microfinance institutions have become common sources of funding for micro-enterprises, particularly in the Third World.

Field survey result have shown that majority of the microentrepreneurs source(Fig.3) their fund from personal savings (56.4%).Sixty five (26.8%) source from loans from the bank, 8.6 %(21) from cooperatives, 4.1 %(10) from relatives and other source respectively.



MICRO-ENTERPRISE AND ENERGY

Energy is an indispensable resource not only important for development, but also for the improvement of the welfare of the people. Economy is energy-driven and the high consumption level of the society is also energy-dependent (Fig.4). For any economy, energy must be present in sufficient amount at all time and in all places. Field survey analysis have shown that the some micro-enterprise in Minna depend partially or wholly on electricity to operate (80.7%).

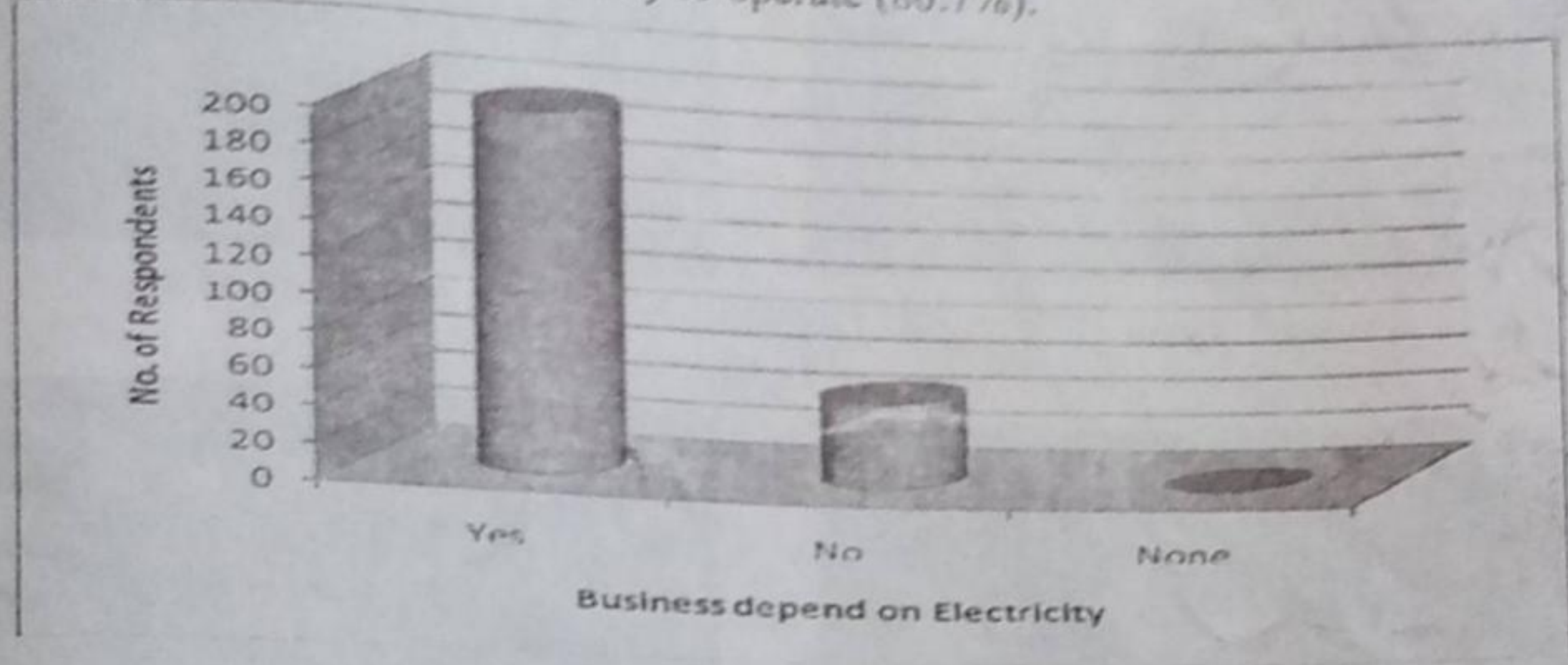


Fig.4: Micro-enterprise and Electricity

SOURCE AND ADEQUACY OF ENERGY SUPPLY

The energy profile shows considerable deprivation in energy sources and energy services in the study area. Deprivation in this case is observable at the level of the business operations and services. The mere absence of electricity prevents the business from rendering their services efficiently and effectively.

Survey result have shown that 95.9%(233) of electricity supply business activity is from the PHCN(Power Holding Company of Nigeria).This is an ideal energy source not only for micro-businesses but also effective industrialization for sustainable development. Other energy source available for business operation is generator sets and plants (4.1%).

However, it was observed that the electricity supply is inadequate in propelling and nurturing effective micro-enterprise growth and development. Field data (Fig.5) revealed that only 4.3 %(10) of the electricity supply by PHCN is very adequate/ very good. One hundred and nineteen (48.9%) of the supplied is said to be adequate/good, 20.9 %(51) of the supply is bad/inadequate while 25.9 %(63) of the electricity supplied is very inadequate/bad (plate1).

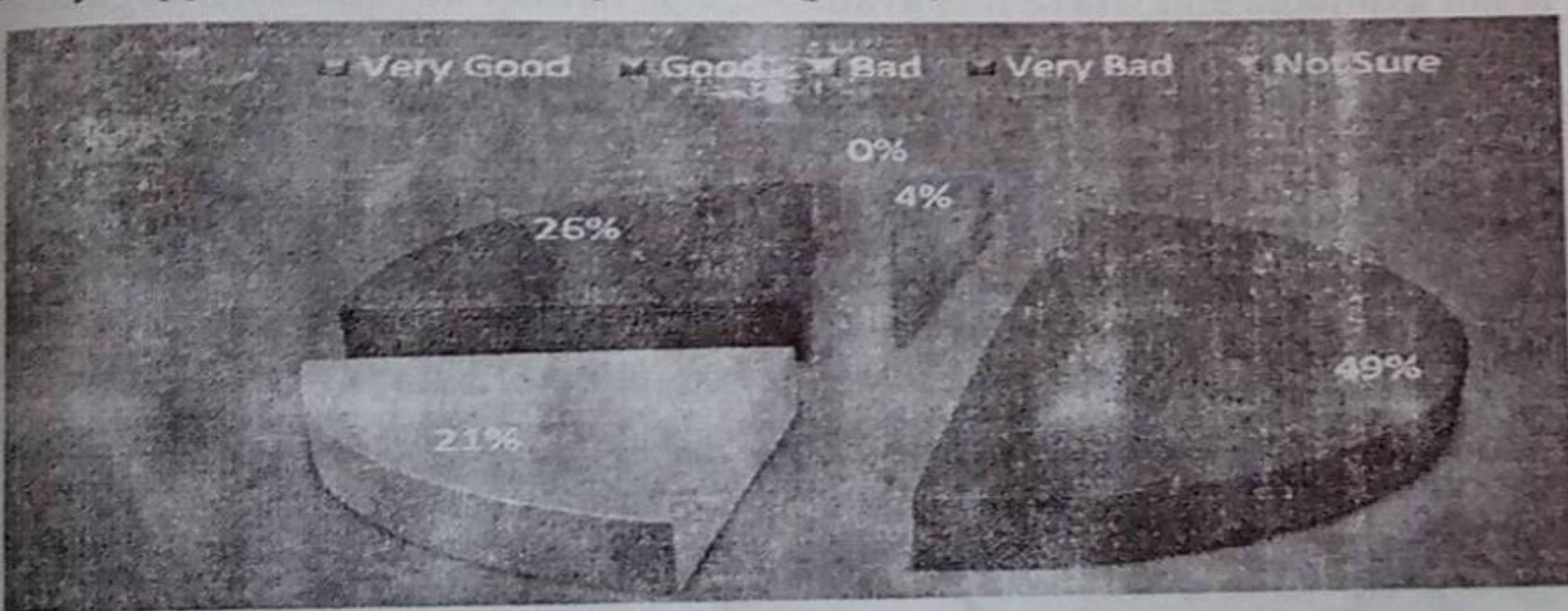


Fig.5: Adequacy of Electricity Supplied by PHCN



(a) Men at work! 10am



(b) Idle Men left at the mercy of power Outage! 12noon



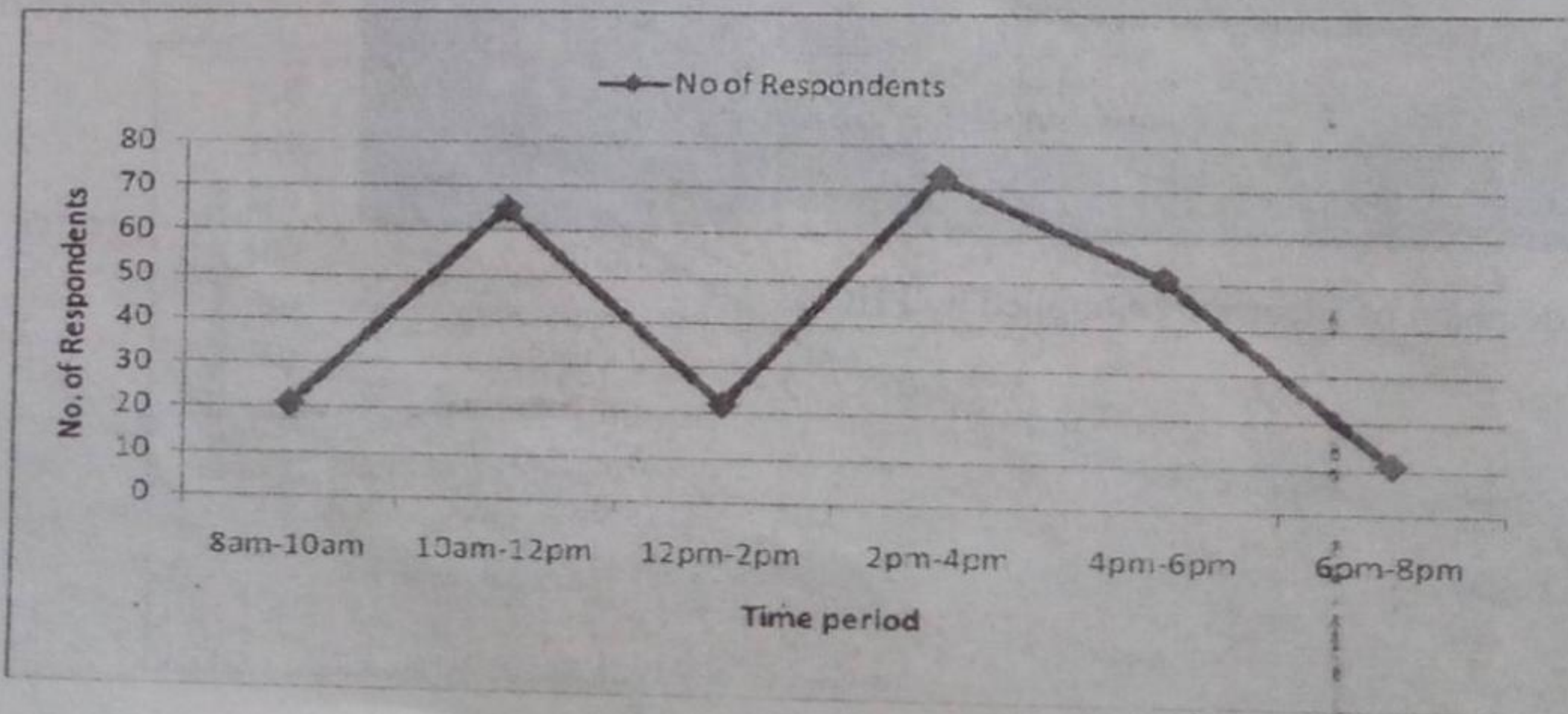
(c) Restoration of Electricity at 7pm, Work Resumed in meeting the Client deadline

Plate 1: Effect of Power outage and Typical Scenario on Business Operation (Old Airport Road Minna, 23/5/2010).

TREND OF DAILY ENERGY SUPPLY

As an important component of human living, energy should be seen as basic need. However, when discussing basic need, energy is hardly mentioned. It is considered as given and hence, there is no need to discuss. Recent events, particularly, in the less developed countries have come to prove that energy is not given, it is not available and where it is available, it is neither adequate nor regular.

All the respondents' claim that electricity supply is very irregular (Fig.6). Field survey has shown that the power supply varies with time. Figure 7 shows that 39.5% of the people enjoy light for average of four(4) hours and above, ninety six(32.5%) for 4hours, fourteen percent enjoy only for 3hours while only five point four percent use light for 2hours. In this respect, 52 percent of the people use electric light for an average of 8hour daily as compared with the developed countries.



Alternative Energy Source for Micro-enterprise Activity

In a way of redeeming the effect of acute short of power supply, most entrepreneurs engaged the use of alternative energy means (Fig.8) to augment the insufficient supply for their businesses. Field survey result have shown that 79.8 % (104) of the entrepreneurs uses generator (Plate 2) and plants as the alternative energy source to support business operation and services, 20.2 % (49) use timeless-inverter to make-up energy for their business when supply failed.



Fig.8: Alternative Energy Means/Source Use in Business Operation

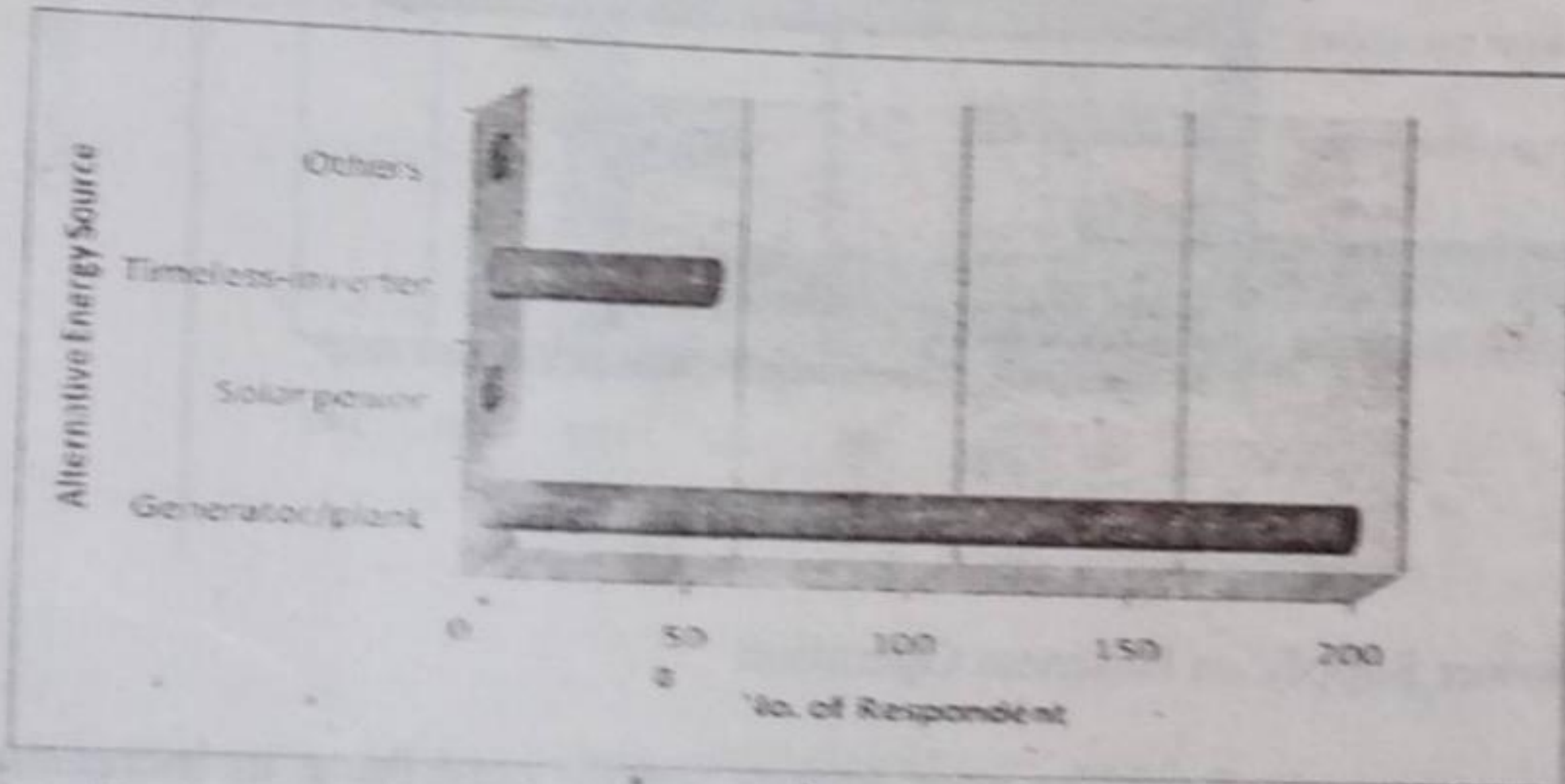


Plate 2: Booming Business: Alternative Energy Means/Source

Effect of Poor Energy Supply on Micro-enterprise Activity

The role of energy in micro-enterprise situation flows from its role in development. Analysts observe that poor people rely on low cost and largely inefficient energy as opposed to the rich people. As a result the poor occupy the lower rungs of the energy ladder. Energy ladder associates people to progressively cleaner and more efficient fuels with corresponding higher levels of income (UNDP, 2001.). It is a situation that is both a determinant and a manifestation of poverty.

Poor energy supply affect micro-enterprise business operation and service in numerous ways (Fig.9). Field survey result have shown that 18.5%(45) caused increasing Over-head-cost/input, 9.5%(23), causes low productivity, 16.9%(41) causes low patronage, 54.7%(133) were caused by all of the above mentioned effect while 0.4%(1) causes other effects like prolong short term jobs, wastage of resource and poor management.

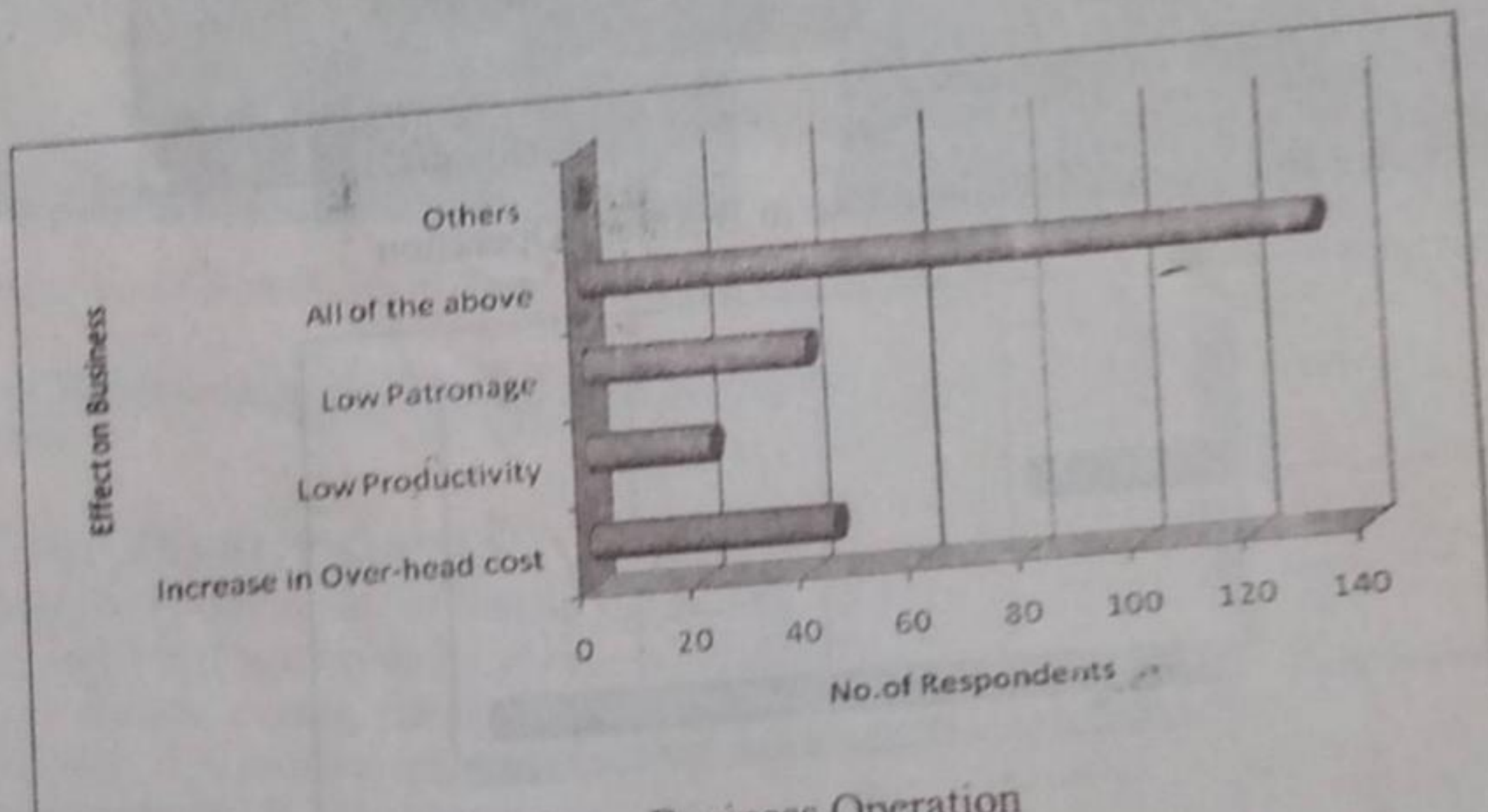
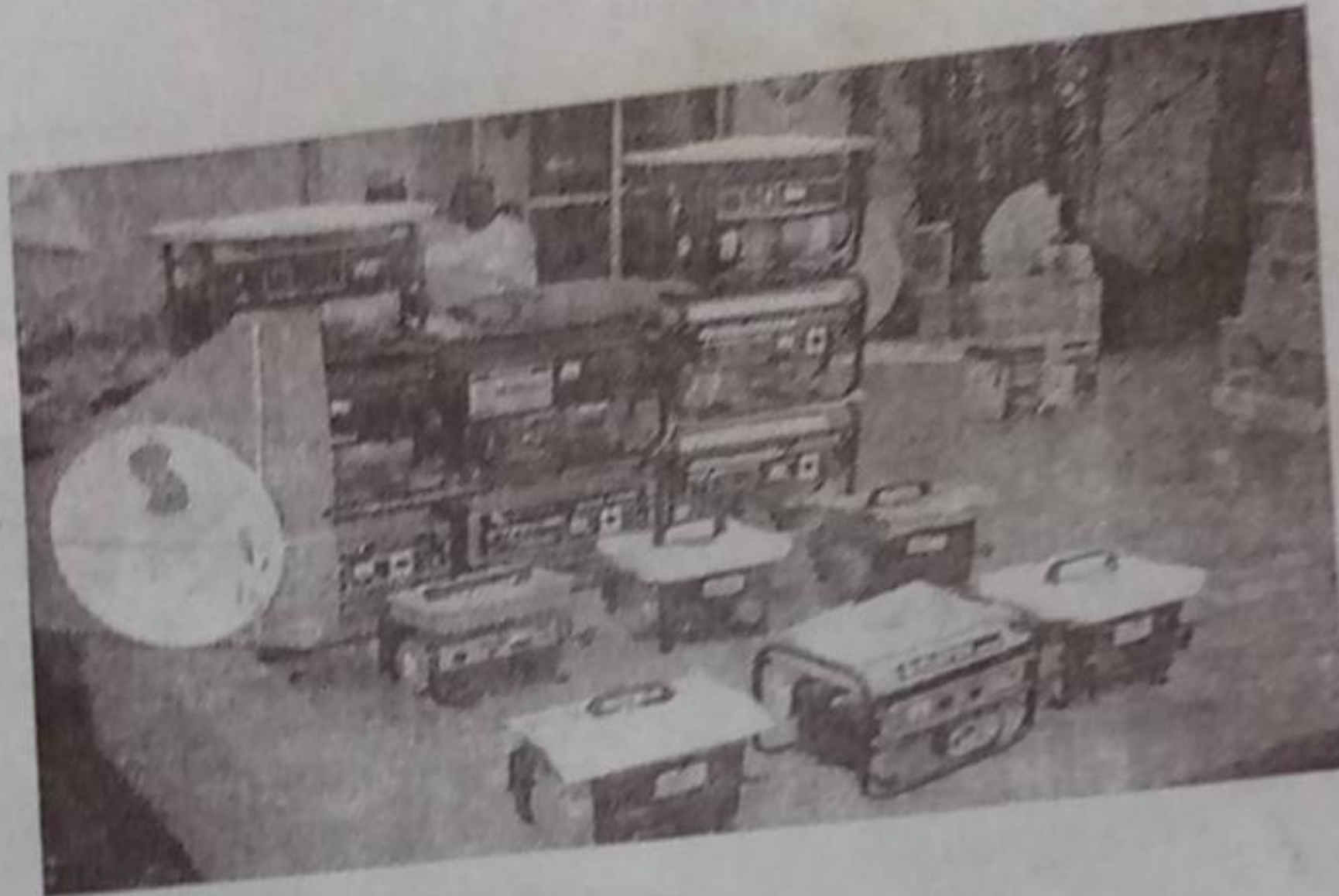


Fig.9: Effect of Poor power Supply on Business Operation

In assessing the extent to which the poor energy supply contribute in increasing the head-cost, 76.9%(165) of the respondents claimed 20% increase in the over-head cost, 20.9%(51) claimed 10% increase in over-head cost, 9.1%(22) and 0.4%(1) are for 40% and 50% increase in over-head cost(Fig.10).

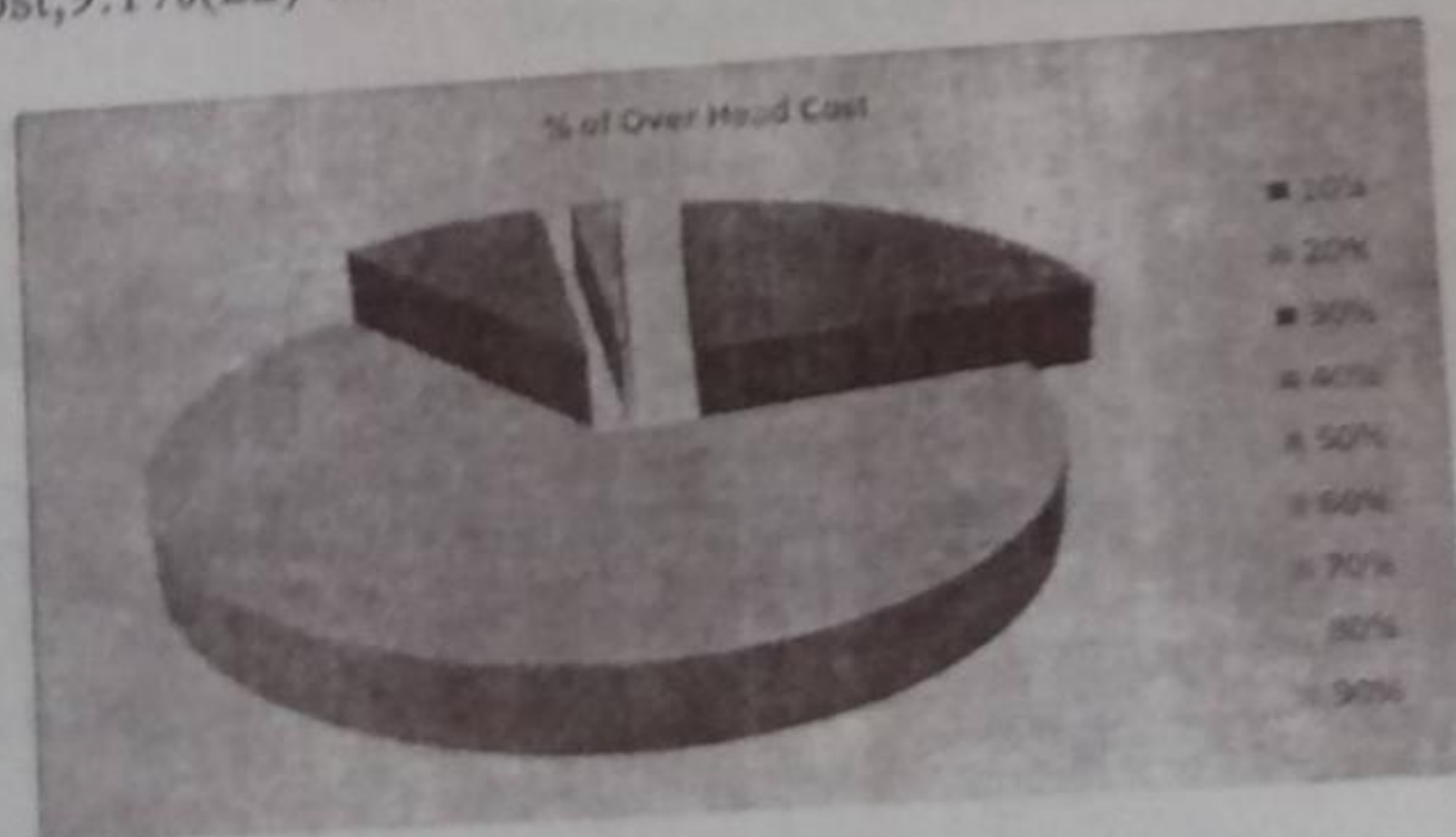


Fig10: Percentage Over-head Cost on Business

Insufficient Energy Supply as a Threat to Micro-enterprise Activity

Field survey results have shown that poor energy supply poses a threat to the activities of viable entrepreneurs in their investment. Survey on power use (112) revealed that poor energy supply can result to threat of business insecurity, 54% (60) claimed the threat of liquidation/bankruptcy, 45% (50) fear resultant liability/debt while 44% (49) claimed the threat covered all the have been mentioned above (fig.12). Therefore, insufficient energy supply for business activity has gross implication on businesses: uneven and unpredictable impact on markets and macroeconomic disruption. It also has the potential to undermine the value of business assets, diminish investment viability which could ultimately impact profitability and even solvency (INEP Financial Initiative, 2012). The effect is that poor nations and poor communities continue to rely on available energy types and use less of alternative modern and more efficient energy technologies. Degradation in economic front runs is ugly local in degradation in energy. The degradation in energy supply and consumption is frustrating to the achievement, growth and development of micro-enterprises in the country.

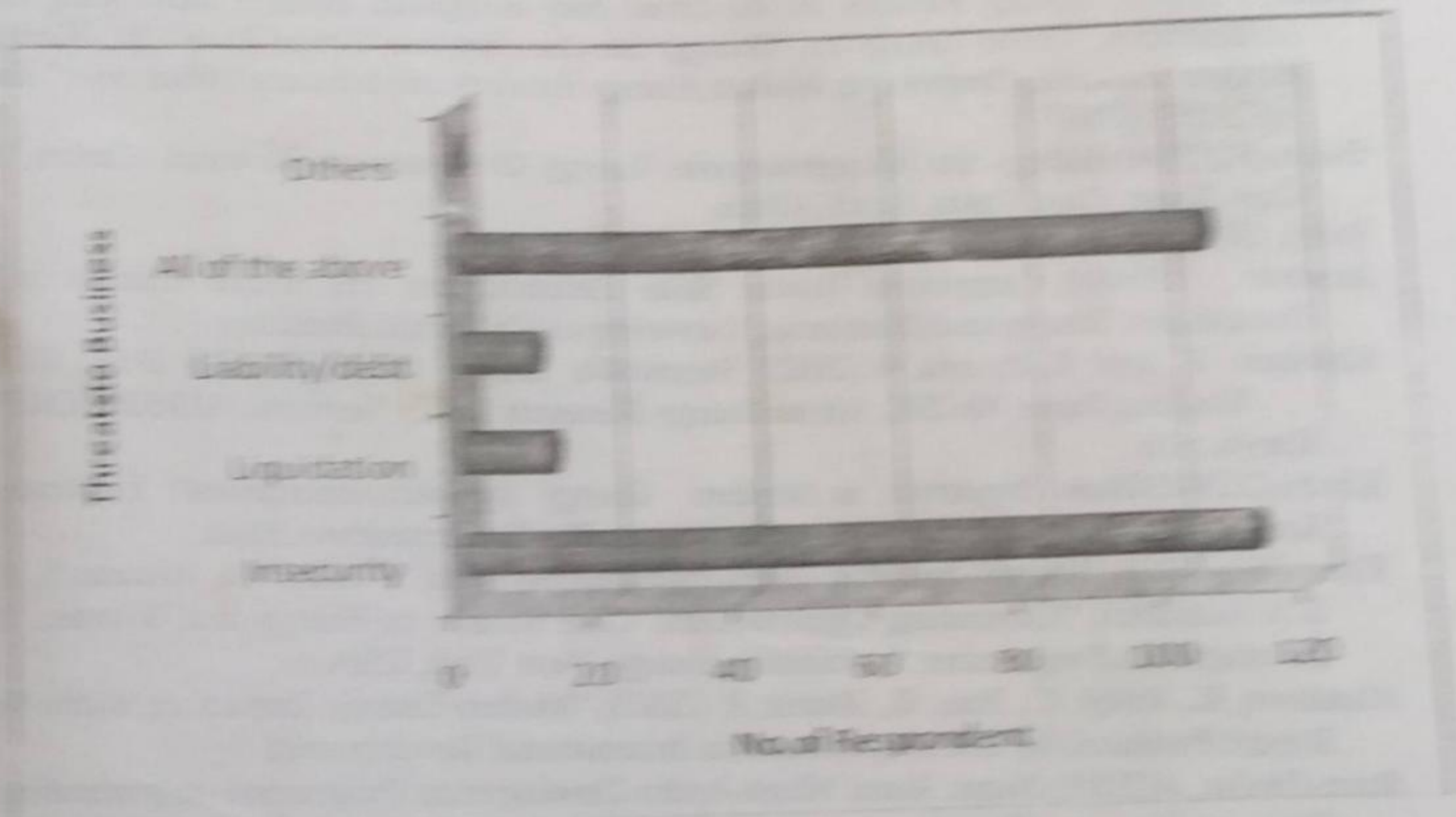


Fig.12 Possible Threat to Micro-enterprise Activity

CONCLUSION

Poor energy supply has gross implication on businesses: uneven and unpredictable impact on markets and macroeconomics disruption. It also has the potential to undermine the value of business assets, diminish investment viability which could ultimately impact profitability and even solvency (INEP Financial Initiative, 2012). Power outage is a common scenario in virtually all villages, towns and cities in Nigeria which has led to the fold up many micro business enterprises and the micro enterprise have been recognized as significant generators of employment in both developed and developing countries. Micro enterprises are essential actors in the development process. Together with larger enterprises, they play an important role in mobilizing resources and allocating them amongst productive activities. They are driving force behind the related flow of trade, investment and technology, on which the strength and dynamism of an economy depends. Therefore, for Nigeria to compete favourably with other economy of the world, for unemployment to be drastically reduced, power generation, transmission and distribution must be made efficient as obtainable in some developing and most developed countries of the world.

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