

Problems and Policy Implications for Ecological Marketing Perspectives: A study on Natural Gas Distribution System of Bangladesh

Asma Jarin

Assistant Professor

Southern University Bangladesh

Email: asmajarin@hotmail.com, asmajarin@southern.edu.bd

Abstract

Establishing an eco-friendly and sustainable energy chain is one of the greatest challenges of our time. We have to most urgently, find out possible ways to drastically reduce emissions of greenhouse gas such as carbon dioxide. One effective solution of this problem is to switch on natural gas – an effective alternative to other established energy sources. Natural gas is the key energy resources on the pathway towards more climate-friendly choice from private households through industry to transportation. Natural gas already covers around most of the global energy demand and is therefore one of our most important sources of energy today. It is essential to identify the problems for natural gas marketing practices and suggestive recommendation for resolving the domestic customers consumption crisis. This article basically based on Karnafully Gas Distribution Company Limited (KGDCL) natural gas distribution system.

Keywords: *Natural Gas, Ecological Marketing, Karnafully Gas Distribution Company Limited (KGDCL)*

STATEMENT OF THE PROBLEM

In the recent world environment, protection and consciousness is the main concern for all parties as like manufacturer to ultimate consumer. Our commercial and consumption activities cause environment deterioration as like global warming, depletion of stratospheric ozone layer, pollution of sea and rivers, noise and light pollution, acid rain and desertification. Some research reported that about 40% of environmental degradation has been brought about by the consumption activities of private households. Our nonrenewable resources also destroyed by this type of consumption activities of people. The major nonrenewable resources which we consume daily in huge quantity i.e natural gas for our household use. For this domestic unlimited use of natural gas we face severe scarcity natural gas which drives

us to use ecological marketing concept in natural gas industry for marketing and distribution. Now days marketing activities are considered as hostile to environment and they create imbalance in environment. In the 1980s the country had a gas surplus while in the 1990s, as foreign aid dried up for exploration and drilling, there was fear that Bangladesh would face a shortage from the year 2010. But some studies suggest that besides the above factors, the shortage of gas in the 1990s was due to: (a) delay in completing a development-drilling program, (b) infrastructure limitations and (c) a decline in production in the Bakhrabad gas field. The gas infrastructure limitation was attributed to the absence of the Ashuganj-Bakhrabad gas pipeline (Khan and Imaduddin 1999). Another is lack of consciousness about ecological marketing. Generally marketing

of product increases waste and hamper our ecological balance. As a result our environment face lot of waste of production ,exploration, distribution and consumption of natural gas daily which causes environmental degradation and creates contradiction in ecological balance (Wever, 1996).

In this paper the researcher has attempted to focus on problems and policy implications of natural gas consumption perspective.

ENERGY SECTOR OF BANGLADESH

Energy Sector Structure of Bangladesh can be represented in the figure 1.1

Types of Energy: 1)Non-renewable energy 2) Renewable energy

The proven reserve of natural gas which is the principal source of nonrenewable energy of the country is gradually depleting. The supply of gas as a primary source of energy will be dried out soon if immediate steps are not taken for exploration of new gas fields and extraction therefore. In the use of commercial energy, the notable ones include the following: 1) Natural gas2) Oil from minerals and other sources3)Coal and coal like substance 4) Compressed natural gas (CNG) 5) Natural Gas Liquid (NGL)

In our country renewable energy such as biomass, solar power and wind power are being used since time immemorial. Especially in areas which are outside gas coverage, usage of biomass for cooking and solar power and wind for drying of different grains as well as clothes are known to all. However, we are still lagging far behind in the scientific use of such energy. Moreover, the use of renewable energy has become popular worldwide in view of depleting reserve of non-renewable fossil fuel. Renewable

energy is environment-friendly. At present, the different categories of renewable energy that are being used in limited ways in our country are as follows:

Hydro-electricity Solar power generation using solar rays

Wind-mill power generation using wind power

Production of bio-gas using waste

Electricity produced by Biomass Gasification Method using wood, rice husk, etc.

NATURAL GAS

Bangladesh gas sector started its journey in the 1960s, but its rapid expansion and integration started to accelerate in the early 1970s spurred by the rising oil prices. Until now, 24 gas fields have been discovered. Natural gas fills about 75% of the total fuel consumption of the country.

Because of the increasing demand of gas, the exploration of new gas field and the development of the discovered gas fields are very important. During the financial year 2011-12, a total of 29 projects are being implemented by Petro Bangla and its companies in the oil, gas and mineral sector.(Petrobangla)

The major source of our primary energy is natural gas. Almost three-fourths of the total commercial energy demand is met from natural gas. It is, therefore, considered as one of the driving forces of the economy. As many as 23 gas fields have been discovered since 1955 when the first gas field was found in Sylhet. To reduce the dependency on natural gas, alternative energy resource must be explored. Despite the present government's efforts to create fuel mix in energy generation, natural gas will continue to dominate the county's energy generation and economic development for

several more years. At present, many of the government actions are in advanced stages. Recently gas production has increased from 1750 to 2250 MMCFD (million cubic feet per day). But the deficit still stands at around 400-500 MMCFD, and improvement of inadequate gas transmission infrastructure remains a daunting challenge. Power sector is highly dependent on natural gas. (Petro Bangla)

ECOLOGICAL MARKETING

Marketing might become a part of the solution instead of a part of the problem. Indeed, the ecological marketing research has produced fruitful knowledge mainly with reference to the investigation of the factors that might be able to influence pro environmental behavioral changes. This knowledge aims to be useful both to the public policymakers and to the firms, which are interested in adopting ecological strategies of any type Tilikidou and Delistavrou (2008). Today's the natural environment is an important arena for economy and competition. Ecological issues regarding natural resources pollution and waste offer both are competitive opportunities and constraints .They are changing competitive land scape in several industries. Environmental issues become a competitive aspect for organization .The legal requirement is answered by threshold resources. For that reason organization can gain competitive advantage by managing ecological variables. The way environmental issues are handle by an organization can become core competence for it. Eco marketing appears as a way to gain image trust and confidence leads an organization to a situation of advantage over its competitors.

OBJECTIVES

The overall objective of this article is problem and policy implication for

ecological marketing perspectives: a study on natural gas distribution system. The specific objective of this article given below:

To find out the problems in ecological marketing in context of sample resources.

To suggest some policies implications in order to economic use of nonrenewable natural resources through ecological marketing practices.

LITERATURE REVIEW

Lozada,(1999) studied that ecological marketing can be implemented by efficient use of natural resources and production process ,strategies if all are converted to ecofriendly and eco efficiency manner. He also mentioned that companies were also benefited by changing their strategy, using nonrenewable natural resources and adopting ecological approach.

Gomes (2013) identified that Bangladesh is facing a huge scarcity in supply of natural gas to maintain minimum standard required for the basic functioning of the population. Moreover our country should develop a better understanding of the potential for unconventional gas field and introduce some policies .There are major challenges such in exploration and challenges as developing trend in the size of underdeveloped gas fields lack of geographical information for unconventional and frontier areas limited technology skills and human resources.

Bidderman,et al.(2007) stated R&D spending in the energy industry, which includes gas transmission and distribution, has been declining and is below comparable to other industries. Therefore, in developing a measure of R&D investment, an adjusted R&D intensity measure will be used for the natural gas

industry and where possible, for the industries to which it is to be compared. The comparison in the study also evaluates the organizational structures and Strategies for managing R&D activities in the industry.

Atiquezzaman, et al.(2013) found that variation of gas transmission has impact on pipe line pressure. When the pressure falls to a certain value, higher hydrocarbon content of natural gas becomes liquid and the reduced pressure hinders the gas transmission especially when it is expected to transmit across a long distance. The Reduced pressure also clarifies the importance of setting up compressor station to boost up the pressure and transmit a larger volume of gas through an existing pipeline system. With the increasing rate of natural gas consumption, it is necessary to visualize the effect of pressure change when the consumption rate increases.

Zohir, (2002) stated that lacks the technical capability to conduct gas exploration and necessity for an unbiased Production Sharing Contract (PSC), an accurate estimate of gas reserves, and appropriate pricing strategies. The analysis suggests that currently Bangladesh is no longer experiencing shortage in the supply of gas. Thus, the pricing of gas needs to be determined on the basis of economic cost and depletion premium. Moreover, a comprehensive gas policy should be developed with a proper regulatory body that has oversight responsibilities. Efficient gas marketing is the key to deriving numerous benefits from the gas reserves of Bangladesh.

Islam and Raihan (2011) focused on some issues as like management related aspects, the factors affecting the natural gas market, identified environmental issues and at the end some recommendations have been placed for

the improvement of the management of natural gas.

Islam, (2011) stated that the lack of prudent policy making and implementation, the country is facing energy shortage right at this moment. For a sustainable energy growth, the country would have to shift to renewable source of energy while, an excellent mix of various source of energy in the intermediate period is essential to support current economic development. Moreover, Bangladesh may have to think about import of gas as the country to keep up its GDP growth rate of 6%.

Kovacevic,(2007) found that many unknown, or insufficiently known, components involved in the development of large scale natural gas infrastructure. Moreover he also mentioned that instead of relying solely on regulatory and nominal frameworks, more durable physical security – such as multiple transit routes, availability of storage and flexible shipping solutions competition between routes – are proposed to create a truly commercial regulatory framework.

19th World Energy Congress, Sydney, Australia focused The United Nations Conference on "World Development" held at Rio De Janeiro, Brazil in 1992 and known as the "Earth Summit" called for the importance of not only protecting and preserving the environment but also for the optimal use of natural resources as well as achieving sustainable development . The continuation of the successful current and expected natural gas policies (fuel switching, gas exports, etc.) combined with the implementation of current and new gas technologies is expected to result in enormous reduction of pollutants emissions and achieving sustainable development in Egypt.

McCurdy,(2013) identified efficient energy distribution and consumption can satisfy the new demand in future at well price. Moreover natural gas can develop in a sustainable manner for efficient use of gas at home, business and industrial sector.

METHODOLOGY

The research method is a strategy of enquiry, which moves from the underlying assumptions to research design, and data collection (Myers, 2009). The researcher used both qualitative and quantitative data for identifying problems and policy implications for natural gas distribution system. Some researchers prefer using mixed methods approach by taking advantage of the differences between quantitative and qualitative methods, and combine these two methods for use in a single research project depending on the kind of study and its Methodological foundation. (Denzin and Lincoln, 2003). Quantitative research makes use of questionnaires, surveys and experiments to gather data that is revised and tabulated in numbers, which allows the data to be characterized by the use of statistical analysis (Hittleman and Simon, 1997).

DATA SOURCES

While deciding about the method of data collection to be used for the study, the researcher should keep in mind two types of data viz., primary and secondary.

Sample Selection of this Research

For this research, the researcher used non-probability convenience sampling. De Vos and Slote (1998) states that convenience sampling is the rational choice in cases where it is impossible to identify all the members of a population. The research is conducted on Chittagong area and sample is Karnaphuli Gas Distribution(KGDCL). The study consider

100 respondents for domestic customer of natural gas and 50 respondents for KGDCL.

Karnaphuli Gas Distribution Company Limited (KGDCL)

Karnaphuli Gas Distribution Company Limited (KGDCL) has been formed on 8th February, 2010 bifurcating greater Chittagong and Chittagong Hill Tracts area under BGSF franchise pursuant to a government decision in order to rationalize and improve the services of the companies under Petrobangla. The commercial activities of the company have commenced from 1st July, 2010.

MAJOR PROBLEMS RELATED WITH NATURAL GAS USE AND NATURAL GAS DISTRIBUTION

The problems faced by natural gas customer and KGDCL are discussed in this chapter. There are lots of shortcoming for KGDCL in supplying to Chittagong city customers. Moreover customers face and create some problems. These problems create some hindrances in ecological marketing practices. These problems are identified through focus group study and questionnaire survey.

In Perspective of KGDCL

Lack of efficiency

By surveying the KGDCL work place there is lack of efficiency in their office. Because most of the people are work in some places for few days and then are transferred to another places. For these reasons the employee cannot get proper scopes for showing their efficiency in their assign duties.

Lack of specialized people

Sometimes in KGDCL we don't find specialized people. Because there are three criteria for recruitment: General cadre, Technical Cadre and Assistant

Cadre. These three categories of people are engaged in performing different types of activities of KGDCL. Sometimes some general people are involved in some technical work. So this incurs the lack of specialization.

Lack of Sufficient manpower

KGDCL faces lack of manpower for proper ecological marketing of natural gas in CTG district. Sometimes the company faces lack of technical people in emergency accident time. In recent times they are going to recruit people in environment awareness department. After recruiting these people KGDCL can maintain proper scope for ecological marketing of natural gas.

Lengthy process

By surveying KGDCL activities we find that this company faces huge time period for marketing, procuring, storing and supplying natural gas to customer. The company performs their activities under control of Petro Bangla. For buying or procuring any kinds of instrument they have to complete national and foreign tender. Sometimes it takes 6 months or 1 year for completion of these tenders based on availability of funds and instruments.

Lack of proper guidelines

This company's total duration is five years. All people who work here are not much efficient for which the company suffers lack of guidelines. Only higher level people interacting with Petro Bangla. So lower level people face lack of proper guidelines.

Centralized decision of Petro Bangla

Most of the times Petro Bangla takes major decisions of gas buying, selling and marketing. KGDCL sometimes faces problems with the centralized decision. Because Petro Bangla takes decision for all gas distribution company

as like TITAS, KGDCL BAKHRABAD and others. For these reasons KGDCL cannot take their own decision for their own sakes.

Government plays a dominant role in Bangladesh Energy Sector. Petrobangla is the key player in the entire oil and gas value chain through the affiliated operating in the upstream, mid stream and distribution and also in mining and marketing activities. This sector has undergone some restructuring following the commissioning of a gas sector master plan and strategic reviews from the major donors, The World Bank and Asian Development Bank. (Gomes, 2013). For this reason KGDCL people cannot participate in decision making process of natural gas marketing. Moreover the company just implements the centralized decision.

Shortage of different meter and other instruments

KGDCL faces lots of problems for natural gas marketing when there is scarcity of meter, regulator or other pipeline for proper customer services. These instruments are not available all the time in their stock. Some instruments are not available in our country. Some instruments are imported from different countries. If there is scarcity of meter and other things then these instruments are unavailable for one year.

Shortage of supply of natural gas

Our country's users are increasing day by day. KGDCL always faces scarcity of natural gas immensely. Some of the gas fields are not effective like others. Some fields are still stop. Scarcity of natural gas is the major problem of KGDCL. Increasing the demand level can create this scarcity problem. In general the total domestic user according to 203-2014 is

468918. So this is huge customer for KGDCL only for domestic sector.

Lack of proper use of Knowledge

KGDCL faces lots of problems e.g. lack of proper knowledge about natural gas, environment awareness. For efficient use of natural gas the officer and staff need proper use of natural gas. Due to lack of knowledge the officer cannot implement the environment concept in natural gas marketing. For ecological marketing of natural gas the officers need deep knowledge about the effect of natural gas. Our natural gas basically sweet gas. It is better than other mineral resources like coal, petroleum etc. It causes less environmental effect.

Delay in emergency incident

Lack of staff, instruments and interactive communication the KGDCL sometimes can't respond quickly to emergency event. Some of the employees do not perform their task properly which incur misuse of natural gas as like quick stopping the natural gas supply due to fire accident in some specific areas. So most time KGDCL can't maintain environment friendly marketing and reduce the misuse of waste of natural gas.

Lack of sufficient logistics

KGDCL people always face the shortcoming of logistics for performing their duty task as like inspection, emergency service and survey and mobile court service. Basically KGDCL employees always face insufficient transportation for accomplishing their duty. KGDCL employee works as a team for any kinds of inspection, building pipeline and Maintenance of RMS and CMS. There is also lack of communication instrument.

Lack of proper training

Due to lack of effective and sufficient training of officer and staff can't perform their duty properly. Lack of environment awareness training program employee can't comply with ecological marketing. Some technical people can't properly conduct maintenance task for insufficient training program on technical issue of natural gas.

Pressure Low or pressure drop

Another major problem is the Low pressure of natural gas for both official and customer side. For this problem the staff or officer or KGDCL can't meet the customer's demand. Sometimes it does incur misuse of natural gas. It is only caused by network problem; national grid problem. 70% customers face these problems.

Illegal use of customer

KGDCL sometimes find that users or customers use natural gas for illegal pressure. Sometimes they change their regulator or changing pressure capacity of natural gas, intersect new pipe line in their service line. Mainly the industrial users are performs these types of illegal activities.

Delay of meter exchange

This is regular problem of KGDCL. Because before repairing and replacement of meter the officer must have to inspect the meter and then submit their report to authorized section. After this report then KGDCL takes the decision of replacement or repairing of customer meter. For accomplishing these steps KGDCL needs more time than another task for meter.

Unadjustment of Customer requirements with Government Rules & Regulation

In recent times KGDCL has found that sometimes customer's requirements

are not fully matched with Company's marketing rules and regulation. KGDCL cannot cross their rules for gas connection. Customers demand and customers area and customer pressure level all of the things must matched with petrobangla marketing rules. Then KGDCL doesn't give connection to customer.

Failure of Instruments

KGDCL natural gas supply can be disrupted for failure of any kinds on instruments. It can be happened for failure of valve or regulator or default in pipeline.

Problem in filter separator block

Sometimes the KGDCL employees find problems in filter for separating condensate from natural gas. This filter can be blocked by different kinds of wastage or corrosion. Then this creates some kinds of low pressure or blockage of service line in customer adjacent.

Distance Area gas connection

KGDCL sometimes takes more time for distant area customer connection request. For distant area customer it needs extra permission for natural gas connection. Moreover distant area gas connection requires different kinds of extra instruments and creates disruption optimum framework of natural gas distribution.

Meter capacity cross

Sometimes the users using tendency or demand cross the meter capacity. Sometimes the customers uses more than their authorized meter capacity. Another way these overload creates disturbance in meter. Moreover customers illegally use more burners in one connection which crosses meter capacity

Operational inefficiency

Overall problem of KGDCL in natural gas marketing is lack operational efficiency. If the total efficiency can maintain properly then environmental consciousness can maintain easily for natural gas marketing. Lack of proper training and maintenances services KGDCL can't achieve operational efficiency in its activities.

Problems in perspectives of natural gas Domestic Customers

Leakage of natural gas

The leakage of natural gas affects the environment friendly marketing activities of KGDCL. It increases the misuse of scarce natural gas. Customers face possibility of destructive accident with the leakage of natural gas. Sometimes this leakage can in their home or service line. The repair of this type leakage can only be handled through KGDCL customer service.

Disturbance of Regulator or meter

Another major difficulty is disturbance of regulator and meter or riser. Company can't easily solve this type of problem because of meter or riser unavailability for customers' connection. Maintenance team inspects and find out the problem of natural gas and report the authority for replacement. If available then it takes a specific time period for replacement.

Stoppage of gas connection for specific time period

Now a days, it is great barrier for natural gas user .Most of the customer in Chittagong Face this problem because of scarcity of natural gas .Day by day user increases in relation to supply of gas by KGDCL. Sometimes KGDCL uses Specific schedule for gas supply for specific area. Basically this schedule of

natural gas supply facilitate the adjustment of gas supply and demand for whole Chittagong region .KGDCL supplies gas for morning time in some area and evening time for some area.

Low pressure

With schedule problem of natural gas supply, the users also suffer by low pressure problem. This problem can happen according to scarcity of natural gas, Pipeline problem, waste deposit in regulator, maintenance problem of natural gas. Sometimes low pressure can happen for any kinds of crisis in national grid of natural gas.

Riser gas leakage

Customers face these types of riser gas leakage problems occur when they use their natural gas. Generally risers are available in domestic customer area. Sometimes it is fully out of order or it needs some maintenance for full functioning.

Fire Accident or different kinds of accident

In customer arena fire or different kinds of accident can happen. But it is a rare event. It can happen due to customer unconsciousness or leakage of pipeline because of old or out of order instrument in natural gas distribution.

Unavailable natural gas supply by KGDCL (no new gas connection)

KGDCL is not receiving the any new application at this moment because of scarcity of Natural gas connection. Lots of apartments are now being built in Chittagong city.so KGDCL has stopped application submission option. Sometimes it creates dissatisfaction among customers.

Delay in gas connection process

Another major factor of natural gas is delaying natural gas connection. Most of the times customers have to wait for long time for natural gas connection after submitting their application or issuing demand note. The causes of these waiting mainly incur for unviability of instruments or riser and company rules.

Lack of environment awareness

It is the main hindrance of ecological marketing. Customers are not conscious about environment aspect of natural gas marketing. Most of the time these users conduct misusing activities as like overusing or using for drying their cloths. Customers are really unaware about this scarce natural resource.

Reluctant to using Natural Prepaid meter

Within 2017 KGDCL will takes initiative for installing prepaid meter for domestics' customers. This prepaid meter ensures ecological marketing of natural gas. But sometimes our customers are not interested to replace their previous meter with this type of new prepaid meter. Because customers are not so much educate to use technology oriented meter and not aware about environment or scarce resources.

These are the major problems we find in this investigation for domestic natural gas user and KGDCL. Basically we find identify these problems for proper recovery.

Policy Implications

For the ecological of natural gas the company and government should develop new policy which can reduce supply gap and enhance efficiency in natural gas distribution. The study also recommended some managerial implication for proper implementation of

ecological marketing in KGDCL perspectives. Here the study tries to give emphasizes on environment safety of natural gas and protect this scarce resources from misuse or over use and maintain proper customer satisfaction. These recommended policies can be:

Create efficient corporate structure

Government, Petrobangla and KGDCL can take proper initiatives for creating reform attain and restructure of the organization from top to bottom. The company can take efficient placement decision for optimization of human resources and reducing cost. When the structure will be organized then any kinds of initiatives can easily applied for organization. So for implication of ecological marketing the company should develop a well arranged and efficient organization structure.

Develop a integrated resource planning for the energy sector

With the help of Government and Petrobangla, KGDCL will introduce an integrated resources planning for natural gas including the concept of environment and society. This policy will ensure ecological marketing and sustainable development. The company should implement the ERP software for every activities then the proper integration can be achieved.

Introduce a new law and increase the fine for fraud

KGDCL can shape the existing law for reducing illegal activities of customer. This policy will emphasis on proper use of natural gas and reduce the misuse of natural gas by delinquent customers. The Government should also monitor this and introduce new rules and add more fine for illegal act.

Minimization of environmental degradation

This is a great policy and also supportive to this research. The company and government should all initiatives for reducing environmental effect from exploration to distribution. Ecological marketing will be implemented through i.e reducing environmental effect. When the company will take all necessary steps to maintain the environment safe then ecological marketing will be properly implemented and customer satisfaction will be achieved.

Implement the Gas System Loss Reduction Plan

KGDCL can implement a system to reduce the system loss. This is environment friendly initiatives for reducing the misuse of natural gas. The government can easily implement this policy for natural gas marketing. In this time KGDCL already reduces its system loss from previous year. For reducing system loss the company could have install new instrument for separating condensent and cleaning the pipeline.

Revised energy policy statement

The government is preparing a Revised Energy Policy Statement that is to provide the broad framework for development of Bangladesh's energy sector. This framework also suggests proper utilization and development of natural gas. The last energy policy was revised in 2014 and still all the gas companies follow it.

When the energy policy will be regularly revised according to international and national law it will ensure environment safety and will enhance optimum use of natural gas. For this reason government should regularly revised the energy policy for proper ecological marketing.

Continue to use competitive bidding for Production Sharing Contracts as the means of attracting IOCs to natural gas exploration and development

We believe that the Production Sharing Contracts (PSCs) are generally well designed and should be continued. The PSCs provide a transparent formula to determine the price received by an IOC for any natural gas discovered and to determine resource royalties payable to the government of Bangladesh.

They allow the IOCs control over costs, which is essential if they are to take substantial investment risks and if exploration is to be undertaken efficiently. They provide significant resource rents to Bangladesh, with all exploration risks being taken by the IOCs. Appropriately, PSCs ensure that resource rights gradually revert to Bangladesh.

Maintain continuous supply of natural gas

In this study we find that customer faces scarcity of natural gas. For solving this problem KGDCL can maintain continuous flow of natural gas by using different sources as like LNG, Bio gas etc. KGDCL could have utilized its all opportunities for meeting huge customer demand of Chittagong City. The company has to ensure proper and innovative environment friendly distribution system for natural gas.

Make a clear Knowledge about Natural Gas composition and natural gas impact

The concentration of CO₂ in the atmosphere is soon set to pass through 400 ppm mark. Most climate scientists consider that this represents unacceptable Chemical experiments with the earth's atmosphere.

Climate change challenge means we have to the most efficient use of all

available energy sources. Natural gas is a clear burning fuel than coal and oil, which offers solutions to the world's economic and environmental challenges in a secure and sustainable way.(International gas union)

Natural gas is mainly composed of methane. When it is burned, it produces more water than carbon dioxide by mole, in contrast to coal which produces mainly carbon dioxide, it produces only about half the carbon dioxide per kilowatt-hour that coal does. Current estimates by the EPA place global emissions of methane at 85 billion cubic meters (3.0×10¹² cu ft) annually, or 3.2 per cent of global production. Direct emissions of methane represented 14.3 per cent by volume of all global anthropogenic greenhouse gas emissions in 2004 but less than coal and other minerals.(www.wikipedia.com)

Exploring the Total natural Gas Compositions of KGDCL

Analyzed by KGDCL, natural gas includes 94.19 methane produces less carbon dioxide than other minerals. By exploring gas composition the KGDCL could have creates a clear knowledge among their huge customers of Chittagong city. Our natural gas is very much safe than other natural resources. Natural gas is sweet gas by comparing to other resources like coal and oil which produce more carbon dioxide. In the table shows the 96% of methane and 0.356 carbon dioxide. So it is very much essential to explore the gas composition to the customer .Now the study represents total view of gas composition of natural gas in November'2015 in the following table:1.2

Create an environment consciousness among customers

For sound ecological marketing we have to create customer consciousness about the natural nonrenewable resources

of Bangladesh and our natural gas. KGDCL can publish the total information of recent demand and supply natural gas for CTG city. Then customer gets proper information about the reserve of resources in Bangladesh.

During extraction, storage, transportation, and distribution, natural gas is known to leak into the atmosphere, particularly during the extraction process. A Cornell University study in 2011 demonstrated that the leak rate of methane may be high enough to jeopardize its global warming advantage over coal. This study was criticized later for its over-estimation of methane leakage values. (www.wikipedia.com)

Customers must have knowledge about the leakage of natural gas which creates some kinds of environment pollution.

Make the customers understandable that it is scarce nonrenewable resources

Ecological marketing can properly be implemented through creating awareness among customers about the natural gas as nonrenewable and scarce resources. Most of the customers are not conscious about this product properly. They don't think that they can use it unlimitedly. Sometimes they become reluctant to control the using pattern. we can use natural gas in different form as Natural gas, CNG, LNG ,LP .According to Petrobangla Annual Report 2013-2014, domestic customers only use 12% gas. Total national production of gas upto December 2014 is 12.56 TCF.

Building Green image for the company

For sound ecological marketing we have to build up a green image in the market. The green image will generate a more positive public image which can in turn, enhance sales, increase stock

prices, and open access to public capital markets (Marshall & Mayer 1992). A green image may enhance the overall perception of product quality and when coupled with the environmental benefits inherent in a product and /or its use may provide the added value that consumers would favor (Ottman & Terry, 1998).

In this perspective the KGDCL will have to maintain green image for proper implementation of ecological marketing. Positive image of KGDCL can enhance the market growth. They have to publish some article and advertise it's self as eco friendly company to their customers.

Spending revenues to educate buyers about the benefit of natural gas

Spending revenue to educate buyer (e.g. First Brands informational brochures such as "The Good environment guide". (Lozada) The company will have to spend revenue to educate its customer about the positive side of natural gas and sometimes company could inform it customers about natural gas through informational brochures, sms, email message, posters, banner, festoon and promotional cards.

Increase the foreign aid for proper implementation of environment friendly marketing

KGDCL has to integrate some foreign aid for total natural gas distribution. This foreign aid will contribute to ecological marketing and enhance new ways for ecofriendly marketing. In recent there are different foreign aid available for natural gas marketing and increasing its efficiency as like ADB and JICA etc.

Installation of environment Management and standards

Companies can install environment standards and system EMS such as ISO

14000, EMAS and using method aimed at eco efficiency (Vagasi2004).

According to Epstein and Roy 2001, implement these systems companies may systematically specify, manage their environmental obligations and risks. EMS system also provides guidelines to describe and implement environmental strategy. According Bieker 2003 companies can use them for organizing and controlling on operating levels.

Research and Development on Natural gas

KGDCL has to introduce research and development activities on natural gas sector. In recent time the business and regulatory environment in the natural gas industry presents a unique set of challenges. An aging infrastructure and workforce changing supply and demand, working with stakeholders and others drive us to research and development on this sector.

According to American Gas Foundation, 2007

The USA natural gas industry has funded research and development to address the important industry challenges of maintaining the safety and integrity of the gas transmission and distribution systems, controlling costs and enhancing productivity and maintain environmental sustainability . (Gomes, 2013)

The research objectives of R&D on natural gas can be

Improving monitoring and assessment of system integrity

Enhancing system flexibility and throughput and reliability

Reducing incidence and cost of subsurface damage

Improving capability of cost effective construction, maintenance and repair

Improving data quality and timeliness for system, operation, planning and regulatory acceptance

Identify and mitigating environmental issues.

Identify the optimum distribution channel and finding new way for meeting customer demand.

Improving and discovering new gas sector

Eco- labeling for proper ecological marketing

According to Global eco-labeling network an "ecolabel is a label which identifies overall environmental preference of a product or service with in a specific product service category based on life cycle consideration.

It normally attracts the already environmentally and socially aware segment consumers, but it serves as a communication vehicle for awareness transfer to the market at large. Eco-labeling provides information to the consumer, a kind of extended quality assessment of products and services. (Bratt etl.,2011)

The KGDCL will use eco-labeling for informing customer about eco friendliness of product, safety of product, ingredients , using advised information and emergency contact information etc. about of natural gas .the company could have placed eco labeling on the regulating me(RMS) ,riser and meter and other visible instruments of KGDCL.

Use Eco advertising for sound ecological marketing

To put it simply, green marketing is a process of selling a product or service in

a way that takes into consideration its effect on the environments and devise strategies to objectives without negatively impacting the ecology. Eco friendly intention will replace these traditional ways with cleaner digital advertising and internet marketing that bears minimal on the resources(Raspaile,2010).

The KGDCL has to integrate eco advertisement system for promoting natural gas and informing their customer for minimum use. Moreover KGDCL can introduce internet marketing: online advertisement and maintain closer customer relationship interactive communication through their website.

Add carbon tax or Green tariffs with this product as natural resources and justify the increase amount in price

KGDCL should increase price of natural gas as a creating consciousness or reducing misuse of natural gas. Moreover they can add use new concept in natural gas pricing by adding carbon tax or green tariff for environment protection.

Green tariffs In the UK electricity industry, environmentally concerned consumers can opt for a 'green tariff' from many suppliers. This costs about £18 per year more for a typical family, but ensures that the energy purchased on the customer's behalf comes from more sustainable sources Prices can be raised to reduce the consumption of environmentally sensitive products. Price increases can be used to reduce energy consumption or to reduce the flow of tourists to unique and vulnerable habitats, or attractions which are in danger of being overwhelmed (Charles, et al., 2002).

Redesign of Distribution Channel for optimum utilization

The KGDCL could have to redesign its distribution system for the optimum utilization of natural gas and

proper implementation of ecological marketing practices. KGDCL could have to reduce its some zone division by integration. Then it could be beneficial for KGDCL for maintain the zone with less cost and attain the optimum utilization of natural gas.

Replacing and the instruments before any kinds of accident

The KGDCL will replace its old instruments by new instruments and avoiding the possibility of accident before any kinds of pipeline leakage or damage of regulator. The company should takes proper initiatives in advance for making the availability of natural gas instruments. For this replacement they have to inspect the major distribution line properly and regularly.

Periodical Inspection on customer gas connection

For proper implementation of ecological marketing of natural gas the company has to conduct regular inspection on customer connection. It can yearly or half yearly and uses mobile court for reducing illegal user of natural gas, use maintenance team for repairing leakage.

Reordering instruments for Timely delivery

KGDCL should install re ordering system for timely delivery of instruments to its customer and reducing the unavailability of natural gas instruments which can increase customer's satisfaction.

Increasing the manpower for proper maintenance of natural gas

KGDCL will have to increase its manpower for proper maintenance and conducting gas delivery service in its eight zones of total Chittagong City. For this reason the company could have to recruit the people who have environment and

technical knowledge i.e. clear understanding about the environmental impact of natural gas.

More emphasis on customer satisfaction related factor

The KGDCL should have to give more attention on most influencing seven factors of customer satisfaction i.e. environmentally clean energy, less environmental impact, structured infrastructure, distribution system, bill payment, quality of gas service, value delivery complexity. If the company try to improve these factors then customers satisfaction will be enhanced.

Increase profit and Condensent sales revenue and decrease system loss and gain

For ecological marketing KGDCL needs have to increase the profit and use the efficient technology for reducing system loss. If the company could have increase the profit it can shows its performance .Moreover it should invest its profit for restructuring the total organization and will making it fully eco friendly.

CONCLUSIONS

At the end of this research the concludes that ecological marketing is not a new concept but its acceptance increases day by day because today's world now eagerly responding toward environment consciousness. In 2015 COP21, also known as the 2015 Paris Climate Conference, will, for the first time in over 20 years of UN negotiations, aim to achieve a legally binding and universal agreement on climate, with the aim of keeping global warming below 2°C. It is particularly effective for natural gas marketing because it's fully natural product and low environment affect i.e. its produces less carbon dioxide in comparison to other natural nonrenewable

resources. This research also supports that this concept clearly that it has less negative effort on environment. Distribution Company tries to cover the Chittagong City demand for natural gas, but the demand is increasing day by day. The researcher tries to find out problems and suggestive recommendation for efficient distribution of scarce natural gas for meeting huge demand of domestic customer.

REFERENCES

- Atiquezzaman,K.M.,Shamsuddoha,M.and Quraishy,I.A.S.(2013).*Pressure drop analysis of natural gas transmission line in Bangladesh, International Journal of Chemical and Biological Sciences, Vol:1,ISSN:2320-4087.*
- Bieker,T.(2003).*Sustainability Management with the Balance Score Card, Corporate Sustainability, 5th International Summer Academy on Technology Studies.*
- Bidderma,N.,Fay,J.,Mcclinton,M.,andWhelan,M.(2007). *Researchand Development in Natural gas Transmission and distribution.*
- Gomes, I. (2013). *Natural Gas in Pakistan and Bangladesh: current issues and trends.*
- Epstein, M. J., & Roy, M. J. (2001). Sustainability in action: Identifying and measuring the key performance drivers. *Long range planning, 34(5), 585-604.*
- Khan,M.A.A. and Imamuddin,M.(1999). "Gas demand and supply scenario and gas reserve of Bangladesh" chapter in proceedings:2nd petroleum Engineering
- International Gas Union, *The role of natural gas in sustainable energy*

- market, International Gas Union
,www.igu.org
- Islam, M. S. (2011). *Research Report: Energy Sector of Bangladesh. IDLC finance limited.*
- Islam,S.M. and Raihan,M.K.(2007). *Natural Gas Management: A Bangladesh, Perspective,ndc.gov.bd*
- Marshall, M. E., & Mayer, D. (1992,). *Environmental training: It's good business.* Business Horizons,March/April
- Lozada,R.H. (1999): *Ecological Sustainability and marketing strategy: Review and implication,* Seton Hall University, www.sbaer.uca.edu/research
- Ottoman,J. and Terry,V.(1998) *Strategic Marketing of Greener Product,* Journal of sustainable product design,April.www.greenmarketing.com
- Peattie, K., Ottman, J., & Polonsky, M. J. (2002). *Marketing and sustainability.* Centre for Business Relationships, Accountability, Sustainability and Society in association with the Centre for Sustainable Design.
- Tilikidou, I and Delistavrou . (2008) *The Ecological Consumer Behaviors in Greece: Ten years of research.*
- Zohir,S.C.(2005).*Natural Gas Sector in Bangladesh Issues and Options,* www.researchgate.net/
- Kovacevic, A. (2007). *The Potential Contribution of Natural Gas to Sustainable Development in South Eastern Europe.* Oxford Institute for Energy Studies
- Denzin,K.N. and Lincoln,Y.S. (2003).*Collecting and Interpreting Qualitative Materials.Handbook of Qualitative Research,* 2nd Edition.
- Hittleman, D. R. and Simon, A. J. (1997).*Interpreting Educational Research. (Second Edition)*
- Karanafully Gas Distribution Company Limited.<https://kgdcl.gov.bd>
- Petrobangla .www.petrobangla.org.bd

Table Distribution of Respondents according to categories respondents for KGDCL and Domestic Customer of Natural Gas

Categories	Number
KGDCL General Manager	5
KGDCL Deputy General Manager	5
KGDCL Manager	15
KGDCL Assistant Manager	15
KGDCL Staff	10
Domestic Customer Male	32%
Domestic Customer Female	68%

Figure: Energy Sector of Bangladesh

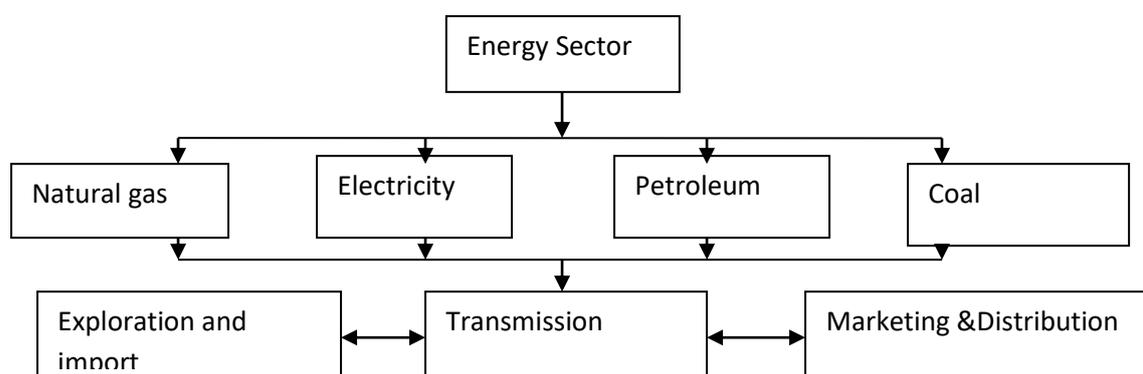


Table Problems faced by customer

Particulars	Percentage problems faced by Customer
Leakage of natural gas pipeline	5%
Disturbance or block of Regulator or meter	10%
Stoppage of gas connection for specific time period	New Gas Connection
Low pressure of gas supply	70%
Riser gas leakage	10%
Accident due to the users unconsciousness or fire	5%
DeLay in gas connection process	If unavailable of instruments

Source: Survey

Table Natural Gas Composition

SL No.	Name of the Components	Design Value (Vol%)	Actual result (vol%)
1	Methane	94.191	96.216
2	Ethane	3.619	2.2275
3	Propane	0.772	0.515
4	Iso-Butane	0.217	0.147
5	n-Butane	0.103	0.096
	Iso –pentane	0.036	0.049
	n-pentane	0.019	0.031
6	Carbon dioxide	0.392	0.356
7	Argon	.068	0.007
8.	Nitrogen	0.0583	0.308
8	Suffer	10(vpmm)	-
9	Heating value	8887.00	8790.55
10	Specific gravity	0.5940	0.5808

Source:KGDCL internal data