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**THE POTENTIAL OF UTILIZING THE BIOMASS FOR ENERGY SUPPLY IN
REMOTE AREAS OF IRAN**

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ABSTRACT

The biomass is a renewal resource of energy and it can be replaced by finishing in fossil resources for supplying energy. Also, there are different resources for the biomass such as wood, waste ,plant residues ,and etc. that itcan be used for different areas of the various sources of biomass used for energy production .In remote areas wherethere arehigh energy loss in the transmission network, using biomass energy production can be done locally .Different advantages for the development potential of renewable energy in the country can be expected that generally depends on local conditions, characteristics of alternative sources and social concerns .The advantages of the use of renewable energy, increased security of energy supply, reduce global warming, stimulate economic growth, create employment, and increase in per capita income, increasing social justice and environmental protection in all fields .In some villages in Iran with regard to the issue of access to oil and gas or fuel, use of biomass resources for energy production can meet many of the environmental problems and energy .The use of biogas plants in the deprived areas could be the perfect solution to many economic problems, environmental and health areas .The use of biogas plants in the deprived areas could be the perfect solution to many economic problems, environmental and health areas .If the technical and economic use of these resources be met, human and animal fertilizers in most of our villages

scattered in the environment and environmental pollution caused by certain anomalies provide , will be well controlled by fermentation in the container.

Keywords: Biomass, Local plants, renewable resources, energy production resources, energy productions method, energy wasting

INTRODUCTION

Renewable energy sources from coal, oil and natural gas, the fourth largest source of energy in the world .This resource will provide about 14 percent of primary energy worldwide and currently more than 5/11 of the world's primary energy supply is developed by biomass sources .Biomass is used to describe a range of products derived from photosynthesis .Each year, through photosynthesis, the equivalent of several times the annual global energy consumption, solar energy leaves, trunks and branches of trees saved .Thus, in a variety of renewable energy sources, biomass is unique for the storage of solar energy .Biomass conversion process is as old as the first fire that humans were created by the wood, and like any old event which can be updated, the new processes were developed .Conversion processes can be physical (eg, drying, size reduction or condensation), heat (such as coal) or chemical (eg, biogas production) is. The final product of the conversion process may be a solid, liquid or gas ,this flexibility in choosing the physical form of fuel is one of the

benefits of biomass in the renewable energy sources (1996, Kogan)

The use of biomass as an energy source not only for economic reasons (where fuel is not available easily and at low cost), but for reasons of health and environmental development is also attractive. Systems that convert biomass into usable energy can act in the small capacities as efficient .Biomass is the indigenous renewable sources that require little or no external change .Agriculture and forestry industries are the main resources of biomass that provides substantial opportunities for economic development in rural areas . Emission of pollutants from the combustion of biomass is usually less than fossil fuels .In addition, the use and commercial exploitation of biomass can waste disposal problems in other industries such as forestry and wood products, food processing and rural waste, especially in rural centers to eliminate or reduce .Also in remote areas where high energy loss in the transmission network, using biomass to produce energy can be done locally and localization capabilities are also used as biomass.

The frame work of this essay is as follows: in the first section, we explain the biomass as an energy source, in the second part of the electrical energy technologies for energy production is analyzed, and the sample population, Guilan, is studied as the potential for renewable energy sources, and the third part, we study the feasibility of using biomass for energy plants, and also in the last section, we examine the manner of creating and preparing biomass process. Biomass conversion processes can be physical (eg, drying, size reduction or condensation), heat (such as coal) or chemical (eg, biogas production)

2. The biomass as the energy resource

For biomass, definition is different and diverse in the world. As a simple definition can be said that in the recent past, biomass includes all living things in nature are made from living organisms or their waste and recycling. Biomass is used to describe a range of products derived from photosynthesis. Each year, through photosynthesis, the equivalent of several times the annual global energy consumption, solar energy leaves, trunks and branches of trees saved. Thus, in a variety of renewable energy sources, biomass is unique for the storage of solar energy. The final product of the conversion process may be a solid, liquid or gas, the flexibility to choose the physical form of fuel, renewable

energy sources is one of the advantages over other biomass sources (Kogan, 1996). It is now clear that biofuels derived from agricultural waste products and the world's forests can be as much as 70 billion tons of crude oil annually readily available energy that this 10 times annual consumption of energy in the world. This fuel can also be used in the heat because they can cause significant economic savings. Biomass energy sources that are suitable for a wide range of materials are included. Biomass sources that are suitable for energy production are included a wide range of materials. These materials are included agricultural and forest waste, waste corruptible, sewage, livestock waste (Boyle, 2004, P. 7-9).

2. IT capabilities and potential for providing electrical energy from biomass

Selection of biomass conversion technology is influenced by three factors: access to raw materials and the cost of the final application. Widespread commercial application also requires the development and application of modern technology in order to enable biomass to compete with conventional energy sources. By developing of new and efficient technologies, it is able to produce more energy than before by biomass without increasing the raw materials. In addition, progress in biomass technologies can

significantly cause environmental, social and economic benefits. In Iran, the first digester of producing methane gas has been built in Lorestan, Nyazabad village in 1354. This system has used a capacity of 5 cubic meters of cow manure and it provides the biogas of the next bathroom. In 1359, two small experimental units were built in Bu Ali Sina University in Hamedan were fed with slaughterhouse waste and manure. Sharif University of Technology in 1361 has studied a 3 cubic meters in experimental method that was loaded with cow manure. In some villages in Iran with regard to the issue of access to oil and gas or fuel, use of biomass resources for energy production can solve the environmental problems and energy. The use of biogas systems in the deprived areas could be the perfect solution to many economic, environmental and health problems in those areas. If the technical and economic use of these resources be met, human and animal fertilizers that were scattered in most of our villages can cause to the environmental pollution by its anomalies that it can be controlled by placing them in the fermentation container. The assumptions are based on these basics that due to the fragmentation of habitats in Iran and the use of the national electricity grid sporadically through the biomass energy that is very

expensive, so it is possible to supply energy for remote areas of Iran, The use of biomass energy can be coordinated with the architecture and climate. Biomass contributes to the sustainable development of residential areas that are far from population centers due to a variety of food in biogas production in different regions of the country.

Biomass is as one of the fourth principal energy resources and as the major energy resources in the developed countries (three fourth of world population). In addition, energy consumption by biomass is important in the developed countries. By considering the progress and preparation of biomass, we could be optimist that biomass will be effective more in future in supplying energy for the human. Biomass is able to produce electricity, heat, gas fuels, liquid or solid with different useful applications. About 52 percent of the rural waste in Iran is the spoilable materials that have high humidity, and these materials can be used for anaerobic digestion process and biogas production. In addition, the other rich materials of this process are the nourishing materials for soil improvement. Thus, the correct use of biomass resources as it is focused in many countries; it should be focused in the development plans in our country. But these assumptions are successful when it operates

correctly. For example, we consider Guilan as the sample study, and we study the biomass resources in this province. First, we detect all of the resources and the statistics should be collected by the references. This section relates to the livestock waste. To determine the potential of biomass from livestock waste

first livestock statistics should be collected by agriculture organization for each city separately from and Census of goat, sheep, cattle, native, mixed cattle and beef. About 52% of rural waste materials are corruptible and can be used as a source for biogas production.

Table 1: Shows statistics for the rural population and the number of livestock in the province of Gilan (1)

14	225	1152	32938	47245	8989	64496	Fouman
846	110	619	20326	2364	1268	76740	Some'sara
0	876	6021	23632	47776	12680	77940	Roudsar
0	306	954	38922	98611	32726	39819	Roudbar
507	1330	7166	54233	727	459	236780	Rasht
835	403	2160	67049	202265	21171	117185	Talesh
177	123	764	3060	375	12	21024	Anzali
482	150	3825	10846	18	8	54301	AstanehAshrafie h
250	73	451	18792	12500	4143	29228	Astara
Bufflehead	Original cow	Mix cow	Aborginal cow	Sheep	Goat	Population	Province
Number of livestock							

Resource: Statistics center of Iran

Table 2: Statistics for the rural population and the number of livestock in the province of Gilan (2)

161	102	963	26574	62342	9732	30655	Masal
38	56	1170	26325	37194	8921	28908	Siahkal
1347	162	842	20451	54743	6821	40486	Rezvanshahr
0	247	3077	7464	12472	3097	28644	Amlash
36	86	1467	27472	45591	8267	51812	Shaft
79	181	5485	14857	2272	1802	81078	Lahijan
118	432	3831	11845	13691	5173	52346	Langroud
Bufflehead	Original cow	Mix cow	Aborginal cow	Sheep	Goat	Population	Province
Number of livestock							

Resource: Statistics center of Iran

Then, the potential for animal waste and biogas per capita is estimated in Guilan province in the following **Tables 3, 4:**

Table 3: Production potential of animal waste and biogas per capita in the province of Gilan (1)

Caspian mild climate and high humidity	Suitable	2.8	11.3	266802.9	64496	Fouman
	Suitable	1.3	5.4	150957.9	76740	Some'sara
	Suitable	4.7	18.9	538613.2	77940	Roudsar
	Suitable	5.9	23.7	344228.6	39819	Roudbar
	Suitable	2.5	10.0	862009.4	236780	Rasht
	Suitable	3.3	13.0	557156.32	117185	Talesh
	Suitable	2.4	9.5	73130.7	21024	Anzali

	Suitable	1.9	7.6	150807.3	54301	AstanehAshrafieh
	Suitable	2.9	11.8	125393.5	29228	Astara
Climate situation	Feasibility Index	Biogas per capita (cubic meters)	Capitation (Kg per day)	Total per year	Population	Province

Resource: Statistics center of Iran and Negarandegan calculations

Table 4: The potential for animal waste and biogas per capita in the province of Gilan (2)

Caspian mild climate and high humidity	Suitable	4.3	17.1	191752.569	30655	Masal
	Suitable	3.9	15.7	165222.4	28908	Siahkal
	Suitable	3.3	13.2	195594.6	40486	Rezvanshahr
	Suitable	4.0	16.1	168128.3	28644	Amlash
	Suitable	2.5	9.9	187769.1	51812	Shaft
	Suitable	1.6	6.6	194616.9	81078	Lahijan
	Suitable	3.6	14.3	272635.1	52346	Langroud
Climate situation	Feasibility Index	Biogas per capita (cubic meters)	Capitation (Kg per day)	Total per year	Population	Province

Resource: Statistics center of Iran and Negarandegan calculations

- **Research the feasibility of using biomass to energy plants**

With regard to the preparation and development of technology, biomass can produce electricity, heat, fuels, gas, liquid and solid chemical with a variety of useful applications included. In remote areas and villages that have no access to grid electricity or electricity transmission through the network to its high costs, conversion of biomass into electricity can be effective in the development of these areas and facilitates access to electricity is possible. In this research, review and compare various biomass technologies based on the processing of raw materials, temperature and operating pressure, operating process, consistent with the need for raw materials and auxiliary materials, energy efficiency, energy conversion facilities and has concluded that

the degree of complexity which of these technologies is to score more points. Thus, according to the architecture to provide living conditions in the settlements and the importance of energy supply, it is appropriate for the purposes of this study. The first step is to evaluate biomass sources. How much is available? The example in the previous section of this potential has been assessed. How reassuring production? Perhaps most important is that, whether capable of adjusting the rate of use is required? If biomass is consumed faster than his replacement, it is not a renewable resource. The second step is often neglected, to deal with the cost source. For example, agricultural waste looks interesting, because it seems that no costs are free. However, if a farmer wants the waste collected and transported to another location is not likely to need financial

incentives. Significant amounts of waste produced by the wood industry and agriculture can have negative effects on the environment, for example, the waste can pollute water supplies, or pests and rodents absorb. Using this waste as a fuel can be due to lower fuel costs and it may also be useful for a better environment for the people who live in the neighborhood factories. Designer of the source and quantity of energy not only needs to consider factors that affect the production, but also it should focus on social and economic factors and appropriate to provide a source of biomass and a preferred location for its special effects. (Amin Salehi, 1383). Agriculture and forest waste in this broad range contain sugars, starches, cellulosic and lignocellulosic, combustion technology is applicable to all substances listed and therefore it could be efficient and the performance would be better for those materials that have less moisture. Thermochemical technologies are more practical (pyrolysis - Zghalsazy - gas out) for waste with low moisture content (less than 35%) of cellulosic and lignocellulosic materials used in them (wheat bran and dried stems and leaves and wood). Anaerobic digestion technologies are applicable for materials that have a low moisture content and high percentage of lignin. Solid waste

includes solid waste from commercial operations, office, household and some industries. This term that rural solid waste is traditionally an energy source, solid waste, which means that it is applicable in terms of consumer or suppliers as well as the cost of fuel, it is misleading. Solid waste must be filtered and then by burning or gasification, electricity, heat or methane is produced as a byproduct. The price of buying and selling in decisions of energy use will affect the type of treatment. However, the greater part of the way could be a raw material in the production of energy, recycled materials or fertilizers used [11]. Gas solid waste from rural resources can be used to produce energy. Calorific value of waste and household waste varies significantly from region to region (2002, Xiaodong). This amount is the United States of America around 7 to 14 MJ per kg in West Germany is about 2.4 to 10 MJ per kg (2007, ELA). Advanced techniques are such as fertilizer, recycling and reuse, incineration, production of fuel from waste (RDF), the pyrolysis and hydrolysis. For recovering any of the above methods are needed to isolate and pre-processing. Many of these processes are used in many developed and developing countries. Solid fuel combustion in municipal waste may cause pollution of the atmosphere, , due to the variety of substances contained in

waste, emissions of sulfur containing compounds, chlorine, fluorine, nitrogen, hydrocarbons and chlorinated materials are heavy (2002, Xiaodong). So all kinds of fuel and non-fuel waste village with some hazardous substances are found, the waste is processed or raw, can be turned into energy. Direct combustion technology could be used in two ways in rural waste: burning heaps waste, burning waste processing and incineration of waste derived fuel (RDF). Combustion is done for raw waste in fixed bed method and for fuel derived from waste combustion is done in fluidized bed method. Thermochemical technologies (pyrolysis and gas off) have been tested on fuel derived from waste, among them gas process with oxygen is operated. Anaerobic digestion technologies are also operated in digestion in landfill and digestion in anaerobic tanks for municipal waste. Liquid waste and urban sewage from human settlements has considerable energy and animal waste; these can fermented in anaerobic method and produce methane gas. Anaerobic fermentation of sewage is operated for a long time; the greater part of the gas produced in the power generation machinery as well as in energy was used for street lighting. In most parts of the world, to provide energy for heating gas digester is used in processing facilities (2008, Deublein,

steinhouse) or it can be used for moving the motor to a generator for electricity for the facility to be used. Anaerobic digestion technology is applicable only for this category of sources that it can be used in direct gastrointestinal digestive sludge and sewage treatment plant, and energy production in this case is methane. Food waste anaerobic digestion technology is used for this type of resources by the various reactors, biodegradable organic in industrial waste turn into methane. Livestock waste can turn in to biogas based on the anaerobic digestion. Although the traditional rural communities, livestock waste is burnt directly (cattle manure), but energy production is not pointed so much in the scientific and technical references [10].

The process of providing and preparing the Biomass

Before any biomass material can be used for energy, it is necessary to accept the convert forms to make a fuel that its function and transportation is easier, for example in this case, converting rice bran to coal dust (Amin Salehi, 2004). The conversion process alternatively makes a suitable fuel form for using in furnaces or engine, which can be solid, liquid or gas. A good example is fermentation of sugar cane to produce ethanol as a replacement for gasoline. There are

different technologies for early preparations and these can be classified physical methods, thermochemical and biochemical methods. Physical processes reform the material by drying, reducing the size or increasing the density. Again, there are many options within each category. One or more of these methods may be completed with a biochemical or thermo technology. The thermal decomposition of biomass conversion processes, and in the absence of air at temperatures higher than that, such a process is in fact thermolysis. The products of chemical analysis are solid by heating (with high carbon), liquids and gas with low heating (3.5 comparing to the natural gas). By setting conditions, such as temperature, it is possible to change between these three groups of products. It is more common to the breakdown pyrolysis to produce charcoal and biomass to gas and for completing conversion process (1994, Hulscher and Frankel). There are two biochemical conversion processes to produce the gaseous fuel (biogas) and liquid (ethanol). Biogas (a mix of about 60 percent methane and 40 percent CO²) is formed by microorganism that analyzes the biomass in the absence of Oxygen (anaerobic conditions). Ethanol is produced in another natural process of fermentation of sugars by microorganisms. This is important that the

costs are calculated for the preparation of the initial equipment in the construction cost. Seating for early preparations to point depends on the use of fuel, as well as transportation costs may be significant [11]. It would be economically effective. Two important factors that govern the choice of technology are the raw material moisture content and density of it. The heating process and chemical analysis by heating are breaking the cells of biomass in the absence of Oxygen and in high temperature. The analysis process makes three groups of the products: Solid that it is known as coal or charcoal, liquid as oil or acid from the chemical analysis, a mixture of different chemical substances. Products vary depending on the chemical composition of biomass and operating conditions, for example pine wood, charcoal, coal tar create more deciduous trees comparing to oak. More than one ton of solid wood products in 350 kilograms of coal, 450 kg of acid caused by chemical analysis, 75 kg and 60 cubic meters of tar. (1994, Hulscher, Fraenkel), generated gas during decomposition has low energy density (8.9 - 3.5 MJ per cubic meter). Transmission is not economical, and it is better to be used for producing heat or power. One of the potential sources of biomass is rural solid waste, which contain high levels of organic materials and these are biodegradable.

Municipal waste has different compositions in different countries due to different culture and consumption patterns.

CONCLUSION

To obtain more welfare it is required to more energy to achieve energy needs, the use of fossil fuels are available and affordable. This type of fuel is about 59% of the world's fuel. Increasing use of fossil fuels and incomplete combustion caused environmental pollution and air pollution, as well as changes in Earth's climate. Renewable energy technology is as a new technology in the world. Hence, transfer of knowledge and technology from the world renowned technology to developing countries is essential. In addition, the utilization of renewable energy resources lead to the development of less developed regions and the creation of jobs, the development of new roads in remote areas, the development of land use and socio-economic effects. Renewable energy resources are often located in remote areas and less developed. A per MW of electricity generated from renewable sources, almost 2 times the number of plants produced by conventional power plants. The results obtained are the following: biomass as the fourth major source of human energy as the largest source of energy in developing countries. In addition, biomass energy consumption in industrialized

countries is important. With regard to the preparation and development of biomass technology, there is great optimism that biomass will play an important role in powering human needs. Biomass is capable to produce electricity, heat, fuels, gas, liquid and solid with a variety of chemical useful applications. Due to the natural geography and magnitude of global climate and energy problems in remote areas, the available resources are important in these areas, and this kind of energy that is primary resources is used in wide range in some provinces in Iran, in addition, it leads to energy supplying and energy saving in fossil fuels. In remote areas and villages that have no access to grid electricity or electricity transmission through the network to its high costs, conversion of biomass into electricity can be effective in the development of these areas, and the access to energy is possible. Thus, according to the architecture in providing living conditions in the settlements and the importance of energy supply, are the results of this research. Reliable source of energy as renewable energy sources are local resources - energy supply for local communities, less influenced by political, social and economic, regional and international conditions. Therefore, the energy from these sources could help to increase the country's

national security. The crisis in the world due to war and political conflict, the current major energy carriers such as fossil fuels are heavily influenced that it leads to rise in prices in different societies in the world. If the countries supply the major part of energy by renewable resources, they wouldn't be influenced in this condition that it is the supplier of sustainable development aims in the countries. It leads to energy production with the constant price. In the common plants, the fossil fuels are the last price in the produced electricity that it is influenced by the used fossil fuel in the plant; it has the variable price in the world. Due to the unpredictable fossil fuel prices, so the cost of electricity production also fluctuated, and is not predictable. The studies are carried out in the design and construction of power plants, renewable energy source for power plants prior to plant construction, and the existence, amount and adequacy of sources of energy, and then ensure that plants are designed, installed. The other results of the study are diversification of the energy basket of the tasks of the Ministry of Energy and organizations in the development of the country's 20-year vision plan, as by diversifying the energy supplying, the security of energy supplying would be increased that it leads to increase in the

national security. Therefore, in addition to other energy sources such as nuclear energy, the use of renewable energy is also important. The use of renewable energy not only leads to diversification in energy supplying, but also it could be exported by using this energy and reducing the internal consumption of fossil fuels. Source of clean electricity from renewable sources leads to low pollution. In comparison with conventional fossil fuel power plants, power plants of this type of small quantities of gases create carbon dioxide, sulfur oxides, carbon monoxide and dust particles into the environment. The amount of electricity production from renewable energy equals to one percent of the country's electricity production that it is the duty of government. Development in application of new energies such as geothermal, wind, solar, hydroelectric and biomass are important. Economic development potential is a kind of renewable energy as a major resource for producing electricity that it provides the possibility of exploitation of indigenous energy sources.

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