International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 3 Issue 9, September- 2014

The Role of Energy Managers to Conserve Energy in Agriculture Sector

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***Abstract*—An attempt has been made in this paper to reveal the role of energy managers in agriculture sector in order to conserve the energy in agriculture. Energy consumption or demand generally refers to the term energy management which means saving of energy. The energy management is often referred to as demand management. Energy demand management usually implies actions that affect the quantity of energy consumed by users. It also includes actions targeting reduction of peak demand during periods when energy supply systems are constrained. The study of energy management is very important for any engineer who wants to excel in the technical field. This research paper is a concise approach to the field of energy management in agriculture sector. This paper will act as an important tool for technical persons in providing an insight into the field of energy conservation and energy management. In this research paper it is described how we can conserve the energy in agriculture sector. By adapting simple measures and energy conservation techniques we can help in saving wastage of energy and raw material that we used in agriculture sector.**

Keywords*—Energy conservation measures, Energy audits, Bio-diesel fuel, Renewable portfolio standards, Best efficiency point, compact fluorescent lamp.

1 INTRODUCTION

The term energy management refers to the saving of energy. This notably means improving the efficiency of powered devices such as electrical equipment sand the development of renewable energies. The energy management is often referred to as demand management. Energy demand management usually implies actions that affect the quantity of energy consumed by users. It also includes actions targeting reduction of peak demand during periods when energy supply systems are constrained. Over the past two hundred years the use of primary energy sources in manufacturing or processing has evolved from simply using locally available resources, such as waterpower, firewood or coal. Fossil fuels in the form of oil, natural gas, and coal comprises approximately 80 % of world's energy use. We now face a world where combusting fossil fuels such as coal and oil are not considered to be reliable energy sources in longer term due to their decreasing supply in comparison to their demand. Thus we need to understand the traditional sources of energy, their quality, availability, and environmental affects, as well as the other alternatives for energy and the effects of these upon the natural environment and modern industrial economics. So due to this energy management is very important for our future economic growth and environmental balance. Energy is essential for the functioning of most of the agriculture work. Energy management is one of the most serious issues for the future as the demand of energy is incensing day by day in comparison to its supply.

1.1 NEED OF CONSERVATION OF ENERGY

The most important law governing the transfer of energy from one to the other form is the law of conservation of energy which states that energy can neither be created nor be destroyed; however, it can be converted from one form to another form. It also states that total amount of energy in an isolated system remains constant [1]. Energy conservation is the practice of decreasing the quantity of energy used while achieving a similar output at the end for use [2], [3]. On a larger scale, energy conservation is an element of energy policy [4]. Consideration should be given to the Life cycle cost rather than capital cost while purchasing any gadget. It should always be kept in mind that electricity saved is money saved [5-14]. Thus the need of conservation of energy arises because of the following reasons:-

- Energy conservation may result in increase of national security, personal security, finical capital, human comfort and environmental value.
- Individuals and organizations that are direct consumers of energy may want to conserve energy in order to reduce energy costs and promote environmental values.
- Industrial and commercial users may want to increase efficiency and maximize profit.

On a larger scale, energy conservation is an element of energy policy. Encouraging energy conservation among consumers is often considered as a cheaper or more environmentally sensitive alternative to increased energy demand.

The agricultural sector is amongst the major energy consuming sector after industrial sector. The two main sources used in energy in the agriculture sector are electricity and oil for cultivation, irrigation, harvesting and processing agro products. The agricultural sector alone accounts for about 40% share of the total electricity consumption. There are lakhs of electric pumps and equal number of diesel engines operated pumps, on their wells, bore-wells, tube-wells, etc., for water lifting. Lakhs of heacters of land is irrigated by underground water resources. It is estimated that crores of KWh of

electricity and about lakhs of KL of diesel is annually consumed by these pumping systems. It should be noted that rains are not always timely and evenly distributed, farmers prefer pump sets as a more reliable and assured source of irrigation; as result, energization of pump sets have been increasing rapidly. As on today 1 million pump sets had been energized in India. Maharashtra has the maximum number of energized pumps sets ,followed by Andhra Pradesh Earlier, the average capacity of pump sets was 3.68 KW and pump set on an average consumed 6000 KWh of electricity in a year 2012.However ,owing to insufficient electricity supplies, some farmers have also procured diesel pump sets as a standby. The share of mechanical and electrical power in agriculture sector increased from 40% in 1971/72 to 84% in 2003/04.The availability of farm power per unit area (KW/ha) has been considered as one of the parameters of expressing the level of mechanization.

TABLE 1 SHOWS THE SUMMARY OF THE ENERGY USES IN AGRICULTURE SECTOR .

S. No	Direct Use of Energy	Fuel
1.	Operating Farm machinery and large Trucks • Field work(tractors, combines,balers,etc) • Input purchase and deliveries (large trucks)	Diesel Fuel
2.	Operating small Vehicles (cars & pickup Trucks • Farm management Activities	Gasoline
3.	Operating small Equipments • Irrigation equipments • Drying of grain or fruit • Ginning Cotton • Heating for frost protection in groves • Crop flamers • Animal waste management • Standby Generators	Diesel Fuel Natural Gas LPG Electricity
4.	General Farm overhead • Lightning for houses ,sheds and farms • Power for farm household appliances	Electricity
5.	Custom Operations • Field work • Drying • Others	Diesel Fuel Natural Gas
6.	Marketing • Transportation • Elevating	Gasoline Diesel
	Indirect Use Of Energy	
1.	Fertilizer • Nitrogen based • Phosphate based • Potash	Natural Gas

2. ENERGY CONSERVATION OPPORTUNITIES IN PUMPS IN AGRICULTURE SECTOR

Number of field studies has revealed that about 90% of pumps used in agriculture sector are inefficient and wasting crores of rupees worth power and oil. The poor efficiencies are on account of fault installation, sub–standard goods and poor maintenance and there is a scope of improving the efficiency of these pumping systems to the extent of 30 to 50 % by taking corrective measures. Major energy losses in pumping systems occur due to wrong selection of pumps, faulty installation and use of inefficient piping system. The pump rectification work comprises of corrective measures for faulty installation, replacement of inefficient piping with new rigid low friction piping and low head foot valves. The cost of rectification, which is about Rs.2000-3000 per pump, is paid back within 6-8 months from the saving of electricity or diesel that is achieved due to rectification. The power tariff for agriculture sector is very liberal and on an average the cost per unit of electricity used for agriculture is about Rs.0.5 against Rs.6 per unit for industrial sector. Hence it is obligation of the government to encourage and motivate farmers to adopt energy saving measures.

We can conserve the energy in pumps by adapting below mentioned measures

- Larger valves helps in saving electricity /diesel because lesser fuel and power is needed to draw water from well. The efficient low friction ISI mark foot valve though costlier should be used.
- The rigid PVC pipeline with larger diameter should be used .More electricity/diesel is required to pump through small diameter pipes because it offers high friction.
- The pipeline arrangement with higher number of bends and unnecessary fittings are not required as it consumes more electricity/diesel consumption. Therefore the fewer the number of bends and fittings in a pipe, the more electricity/diesel it saves.
- Sharp bends and L-joints lead to 70% more frictional loss than standard bends. Use of these types of bends conserves electricity to great extent.
- The pump work more efficiently when it is not more than 10 feet above the water level of the well. If well is deep, the pump should be installed on a platform at the right height.
- The pipe of shorter length should be used .The pipe unnecessarily high requires more fuel for pumping water. A farmer can save 15 liters of diesel every month simply by reducing the pipe height by 2 meters.

For a high efficiency of operation of diesel engine ensure that

- Engine should not emit too much smoke.
- Use the correct grade of lubricant recommended by the manufacture.
- Engine should be fitted with an oil filter which should be cleaned regularly..

- Keep minimum number of joints in engine and belt of pump.
- Pump and engine should be aligned.
- Tighten the belt and axle time to time so that there will be no wastage of energy.
- Over irrigation can harm the crops and waste vital water resources, irrigate according to established norms of different crops.
- Use drip irrigation for specific crops like vegetables, fruits, tobacco etc. Drip system can conserve up to 80% water and reduce pumping energy requirement.
- Do not use tube well in morning / evening peak electricity consumption hours.
- Service tube well/pumping station regularly to avoid the losses and conserve the energy.

3. STAND –BY ENERGY SOURCES USED IN AGRICULTURE SECTOR

The main requirement of energy in agriculture sector is in the form of tube wells for drawing water from ground and moreover in tractors for cultivation of land but main requirement is only in the form of diesel and electricity for drawing water. So we need an extra source of energy which should replace diesel and electricity for drawing water. Now days most commonly used source are bio-diesel gen set and solar energy panels for electricity production.

4. ENERGY CONSERVATION OPPORTUNITIES IN AGRICULTURE SECTOR BY ADAPTING BIO-DIESEL GENERATOR SETS

Biodiesel has been considered as an alternative fuel to petroleum-based diesel for several years. World biodiesel production has increased rapidly with an average annual growth rate of 40%. Increases in the price of crude oil are forecast to accelerate production. Bio- diesel is the green eco-friendly alternative to fossil diesel fuel. Emission of green house gases from bio-diesel is 55% lower than fossil fuel diesel. The emission of carbon monoxide a poisonous gas from bio-diesel is 40% lower on average than carbon monoxide emission from normal diesel. Bio –diesel has lower toxicity. So the generator sets using this type of diesel act as good stand by energy source because bio-diesel can be used in normal gensets with slight changes. Biodiesel has been considered as an alternative fuel to petroleum-based diesel for several years. World biodiesel production has increase rapidly with an average annual growth rate of 40%. Increases in the price of crude oil are forecast to accelerate production. Biodiesel is a non-petroleum-based diesel fuel consisting of short chain esters (methyl or ethyl) which are made by the transesterification of vegetable oil or animal fat. This can be used either alone, or blended with conventional petroleum diesel in most unmodified diesel engines. Therefore it is a domestically produced, renewable fuel.Figure4.1 shows detailing transesterification technology. Biodiesel use and consumption has been increasing in the USA since the passage of the 2005 Energy Policy Act. The additional cost over regular No. 2 diesel, it is expected to diminish as increased production results in economies of scale.

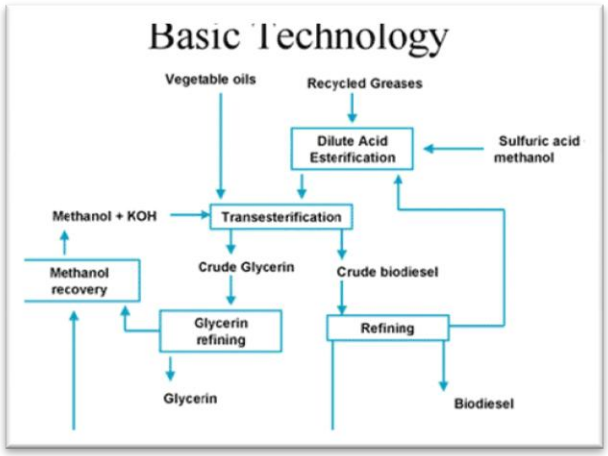

Fig 4.1 Basic Transesterification Technology

4.1 SOURCES OF BIO DIESEL

A variety of oils can be used to produce biodiesel. All of the sources detailed below are available domestically and will reduce our dependence of imported oil. In addition to lowering imports, bio fuels are a renewable energy source. Oil sources for biodiesel are:

- Virgin feedstock - rapeseed and soy bean oils are most common (soybean oil accounts for some 80 to 90% of fuel stocks in the USA), while it can also be obtained from crops such as mustard, flax, sunflower, palm oil and hemp
- Waste vegetable oils - Such as canola oil (limited availability)
- Animal fats - including tallow, lard, yellow grease, chicken fat and the by-products of Omega-3 fatty acids fish oil production.
- Availability is limited without large scale recycling and collection of this oil source.
- Algae - can be grown using waste materials such as sewage without displacing land currently used for food production.

Scientists believe that while algae fuel yields have not yet been determined, the Department of Energy has reported that it has potential to produce 30 times more energy per acre than land crops such as soy beans. The future looks bright with further development in this process.

4.2 ADVANTAGES OF BIO DIESEL

While the main advantage for adopting biodiesel has been promoted as energy security by switching to a domestically produced renewable energy source, there are other reasons a generator set user should consider using biodiesel as detailed below:

- Lower exhaust emissions - Bio diesels, due to their chemical composition, produce lower exhaust emissions than diesel distilled from petroleum. Exhaust emissions and subsequent pollution fall due to a reduction in the

sulfur levels. Regulations are already in place through 2010 to adopt ultra-low sulfur in traditional petroleum based diesel. In addition to lower sulfur, diesels running on biodiesel (B100) have substantially lower unburned hydrocarbons, and carbon monoxide. Particulate matter is reduced for engines running on 20/80 mixture (B20) .Generator systems users in areas where there are very strict emission controls may wish to consider the adoption of bio diesel. Petroleum based diesel has received a close look by bodies responsible for regulating emissions levels due to higher levels of particulates in the exhaust.

- Improved lubrication ability - With the introduction of ultra-low sulfur fuel in 2010, some older engine fuel injection systems may be subject to increased wear due to the lower lubricating properties of ultra-low fuel distilled out of petroleum. The increased lubricating properties of biodiesel will reduce wear of fuel.
- Highest BTU - Biodiesel fuel has the highest BTU value of any alternative fuel, falling between the range of No. 1 and No. 2diesel fuel.

4.3 DIS ADVANTAGES OF BIO DIESEL

The disadvantages of biodiesel, as detailed below, largely parallel those of petroleum diesel:

- Cold weather - B20 biodiesel will tend to gel in very cold temperatures, as does No. 2 diesel fuel. This can be countered by using the same management treatment as No.2. Lower fuel blends like B2 and B5 have virtually no impact.
- Operation on older diesel models - Biodiesel is not entirely suitable for older diesel engines, if using blends higher than B20, impacting fuel system components. Primarily the issue is biodiesel over B20 (20% biodiesel blend) degrading natural rubber compounds (fuel hoses) and fuel pump seals.
- Long term storage - Currently it is recommended be used within six months. After that period, it should be reanalyzed to ensure it still meets ASTM D-6751 specifications. There are additives available that can extend storage life.
- Fuel Filters - Biodiesel can have a cleansing effect on glazed surfaces. When using biodiesel for the first time, the fuel filter should be checked for particles that the biodiesel as cleansed from fuel injection and other fuel system surfaces.

4.4 BIODIESEL USE IN RENEWABLE PORTFOLIO STANDARDS

Renewable portfolio standards (RPS), also referred to as Renewable Electricity Standards, are policies designed to have a certain percentage of a state's electricity generated from one or more qualified renewable resources. Which resources can and are being used is to some degree tailored to fit that states resource base (e.g., solar in Arizona). Across the US, twenty-nine (29) states plus the District of Columbia and two territories have some sort of RPS in place. Currently, no national RPS is in place. The following provides a display of which states have some sort of RPS in place, what the percentages of electricity generation from renewable resources is targeted to be, and future timeframe. Figure 4.2 shows renewable portfolios standard policies.

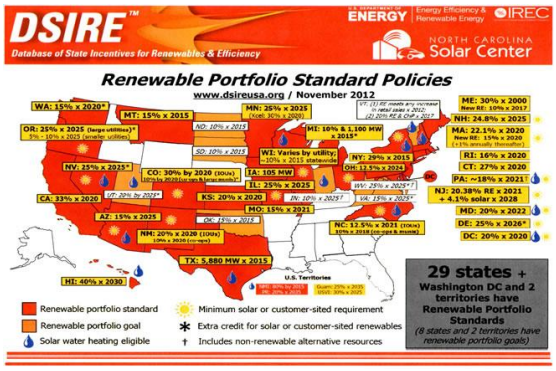

Fig.4.2 Renewable portfolio polices

There are many renewable resources that can be used to help meet these mandates. The major qualifying renewable resources are solar, wind, geothermal, biomass, some types of hydropower, landfill gas, and municipal solid wastes. Not all renewable resources are eligible in certain states and biodiesel is only specifically mentioned by name in nine (9) states, but may be a qualifying resource in others under a general 'biomass' category. These nine states are: California, Hawaii, Illinois, Nevada, New Hampshire, New York, Rhode Island, Washington state, and West Virginia. In addition, some states have in place a renewable energy credit (REC) trading system in which an electricity producer that generates more of his power than he needs from one or more qualifying resources can "sell" the excess renewable energy to someone who doesn't generate enough RPS-eligible renewable electricity.

5. ENERGY CONSERVATION OPPORTUNITIES IN AGRICULTURE SECTOR BY ADAPTING ENERGY EFFICIENT LIGHTING SYSTEM

Proper lighting can increase productivity, ensures safety, Security and improve morale. Many older barns have sub standard lighting that can improve with energy efficient lamps. Such lights would boost milk production and profits. Energy consumption in agriculture sector mostly comprises of electricity used in agriculture for lighting, refrigeration, and power supply for other gadgets. So there is an angle opportunity of energy conservation in electrical energy used in agriculture sector in India. The consumption pattern of electrical energy in agriculture sector is shown in Table 5.1

TABLE 5.1 THE CONSUMPTION PATTERN OF ELECTRICAL ENERGY IN AGRICULTURE SECTOR .

S.No.	Application	%age of consumption
1.	Lighting	35-40%
2.	Fanning	20-25%
3.	Refrigeration	10-15%
4.	Other Gadgets	10-15%

So, electrical energy saving potential lies in lighting luminaries, refrigeration equipments and gadgets. Lot of energy can be saved by adapting latest technologies. The role of energy managers became vital for the conservation of energy. The electricity used over the life time of single incandescent lamp costs 5 to 10 times the original purchase price of the bulb itself. Compact fluorescent lamps and light emitting diode bulbs have revolutionized energy efficient lighting.

5.1 Factors Assosicated With Energy Efficient Lighting System For Agriculture Sector

Some factors kept in mind for the efficient lighting system in agriculture sector are as under

- Lamp rating
- Correlated color temperature index
- Color rendering index
- Light loss factor
- Average rated life
- Type of fixture required
- Mounted height of fixture
- Number of fixture required
- Duration of lighting
- Area to be lighted
- Duration of lighting
- Amount of light required

Table 5.2 The Task On Dairy And Poultry Farms And Recommended Lighting Level

S.No.	Task	Intensity/Light Level Foot-candles
1.	Free Stall	15-20
2.	Tie Stall barns • Feed alley • Centre alley	 15-20 20-50
3.	General livestock housing	10
4.	holding area	10-20
5.	Milking parlor	20
6.	Manual wash sink	100
7.	Vet Treatment area • General • Treatment	 20 100
8.	Utility room	20
9.	Office area	50
10.	Poultry barns	20
11.	Egg packing and inspection	100
12.	Inside incubators	50
13.	Loading & storage areas	20

Lamps

Indian agriculture sector illumination is totally dominated by the incandescent lamp of varying wattage 40W, 60W, 80W, 100W.Desipte their inefficiency; they are still preferred in lower income groups just because of their very low initial cost. Fluorescent lamps are also popular and are used mainly in the utility areas like egg packing and inspection, utility rooms though they are costlier by more than 10 to 15 times than incandescent lamps. Even in the fluorescent lamps, aluminum chokes are predominant, which cost much less compared to copper choke.

Table 5.3 shows comparison of different types of lamps with their properties.

Table 5.3 Comparsion Of Lamps with Their Properties

Lamp	Lumens/ Watt	Average Life	CRI	Instant On	Wattage Range
Incandescent	7-20	750-1000	100	Yes	25-200
Halogen	12-21	2-6000	100	Yes	45-500
Mercury Vapor	26-39	24000	15-50	No	50-1000
CFL	45-55	6000	82	Yes	14-29
Metal Halide	41-79	15000	65-70	No	150-1000
T12 FTL	62-80	9000	52-90	Yes	30-75
T8 FTL	81	18000	75	Yes	86
HPSV	66-97	24000	22-70	No	35-1000

From the above table on can observe that the incandescent lamp is a source of energy wastage because of its low luminous efficiency. In India, about 80% of agriculture lighting is through incandescent lamps. Hence it is one area that should be concerted most for conservation of energy. Now a day's use of CFLs is steadily increasing because of their very low power consumption, long life and better illumination over incandescent lamps. Hence, CFLs may not be replaced when illumination is required for precision work. Following calculations shows how economic to replace incandescent lamp with FTL and CFL. For calculation it is assumed that the operation hours are 5 hours per day and the cost of energy as Rs.3 per KWh

Replacment with FTL

Cost of FTL with copper choke	=	Rs.300
Cost if Incandescent Lamp	=	Rs.10
Difference in Cost	=	Rs.290
Power Consumed by Incandescent Lamp	=	100W
Power consumed by FTL	=	55W
Saving in Power	=	45W
Pay Back Period	=	1 Year

Replacment with CFL

Cost of CFL	=	Rs.200
Cost if Incandescent Lamp	=	Rs.10
Difference in Cost	=	Rs.190
Power Consumed by Incandescent Lamp	=	100W
Power consumed by CFL	=	20W
Saving in Power	=	8W
Payback Period	=	

3Months

In both cases, it can be observed that the savings are very impressive and hence replacement of incandescent lamps is highly recommended. Another method to conserve the energy in this area is to use the natural light effectively so that the period of usage of lamps may be minimized.

6 Energy Conservation Strategies In Agriculture Sector

Lot of electrical energy can saved in the agriculture sector by adapting the suitable energy conservation techniques in the following equipment used in agriculture sector.

- Refrigeration and Air conditioning
- Fan and Blowers
- Solar Water Pumps

Refrigeration and Air conditioning

Refrigerators in India used in agriculture sector for preservation of milk and milk products. If two separate compartments are provided, there can be good energy savings since the loss of cooling due to poor opening is confined to that compartment only. Normally, defrosting is done only when the deep freezer is completely choked with ice, which hampers the effectiveness thus making refrigerator inefficient. Another common flaw is insufficient space behind the refrigerator which deteriorates the heat transfer. Following measures conserve the energy in refrigeration and air conditioning.

- Close doors and windows while running the air conditioning. Don't use fan while air conditioning is ON.
- Use of double door, automatic door closures, air curtains, double glazed windows etc. reduces heat ingress and air conditioning load of farms.
- Maintain condensers for proper heat exchange .A 5°C decrease in evaporator temperature increases specific power consumption by 15%
- Utilization of air-conditioned and refrigerated space should be examined and efforts made to reduce cooling load as far as possible.
- The compressor of the central air-conditioner should be located in cool, shaded space.
- The duct system should be properly sealed .This would save 10% to 15% of electricity into air conditioner.
- Specific power consumption of compressor should be measured at regular intervals.

Fans And Blowers

Fans and Blowers are the main equipments used for drying food grains in agriculture sector. The performance of the fans and blowers is governed by their system characteristics. Fans and blowers are differentiated by the method used to move the air and by the system pressure they must operate against. Most important energy efficiency opportunities for fans and blowers proposed by energy managers are

Choose The Right Fan

Important considerations when selecting a fan are

- Noise
- Rotational speed
- Air stream characteristics
- Temperature range
- Variations in operating conditions
- Space constraints and system layout
- Purchase cost
- Operating cost
- Operating life

Maintain Fans Regularly

Regular maintenance of fans is important to maintain their performance levels. Maintenance activities include

- Periodic inspection of all system components
- Bearing lubrication and replacement
- Belt tightening and replacement
- Motor repair and replacement
- Fan cleaning

Control The Fan Air flow

Normally, an installed fan operates at a constant speed. But some situations may require a speed change, for example more airflow may be needed from the fan when a new run of duct is added, or less airflow may be needed from the fan if the fan is oversized.

Operate Close To BEP

It should be noted that the fan efficiency increases as the flow increases to certain point and thereafter it decreases. The point at which maximum efficiency is obtained is called Peak efficiency or Best Efficiency Point. Normally it is closer to the rated capacity of the fan at a particular designed speed and system resistance. Deviation from the BEP will result in increased loss and efficiency.

Reduce The System Resistance

The system resistance has a major role in determining the performance and efficiency of fan .The system resistance also changes depending on the process. In some cases, the change of equipment, duct modification, drastically shift the operating point, resulting in lower efficiency. In some cases, to maintain the efficiency as before the fan has to be changed.

Solar water Pumps

As on 2010, India's power sector has a total installed capacity of appox.1, 67,000 MW of which 54% is coal based, 25% hydro, 8% is renewable and balance is the gas and nuclear based. Power shortages are estimated a about 11% of the total energy and 15%of peak capacity requirements and are likely to increase in coming years.

Fortunately, India lies in sunny regions of the world. Most parts of India receive 4-7 KWh of solar radiation per square meter per day with 250-300 sunny days in a year. India has abundant solar resource, as it receives about 3000 hours of sunshine every year, equivalent to over 5000 trillion KWh. India can easily utilize the solar energy or solar power. Today the contribution of solar power with installed capacity of 9.84 MW is a fraction of the total renewable energy installed 13,242,41.The role of energy mangers in the field of solar energy utilization in agriculture sector or using it as a good stand by energy source is working or water pumps on solar energy instead of diesel .

A solar water pump is a pump running on the power of sun. A solar powered pump can be more environmentally friendly and economical in its operation. The solar water pumping system is a standalone system operating on power generated using solar PV system. The power generated by solar cells is used for operating DC surface centrifugal mono-block pump set for lifting water from bore/well or water reservoir for minor irrigation and drinking water purpose. The system requires a shadow free area for installation of solar panel. The system is provided with 1800W solar PV panel and 2 HP centrifugal DC mono-block /AC submersible with inverter. The average water delivery of 2 HP solar pumps will be around 1.38 to 1.40 lakh liter per day, for suction head of 6 meters and dynamic head of 10 meters. The size of suction and delivery lines is 2.5 inches.

ADVANTAGES OF SOLAR WATER PUMPS

- No Fuel cost uses abundantly available free sunlight
- No conventional grid electricity required
- Long operating life
- Highly reliable and durable
- Easy to operate
- Eco-friendly
- Saving conventional diesel fuel

Solar PV water pumping systems are used for irrigation and drinking water in India. The majority of the pumps are fitted with a 200W, 300W motors are powered 1800 Wp PV array which can deliver about 140000 liters of water/day from a total head of 10 meters.

7. CONCLUSION

The term energy management refers to the saving of energy. This notably means improving the efficiency of powered devices such as electrical equipment sand the development of renewable energies. The energy management is often referred to as demand management. Energy demand management usually implies actions that affect the quantity of energy consumed by users. Energy conservation is the practice of decreasing the quantity of energy used while achieving a similar output at the end for use. On a larger scale, energy conservation is an element of energy policy. Cheap and sub standard gadgets consume more power as compared to expensive standard gadgets and prove to be costlier on a long run. Consideration should be given to the life Cycle cost rather than capital cost while purchasing any gadget. It should always be kept in mind that electricity saved is money saved. By adapting simple measures and energy conservation techniques we can help in saving wastage of energy and raw material that we used in agriculture sector. Energy is essential for the functioning of most of the agriculture work. Energy management is one of the most serious issues for the future as the demand of energy is incensing day by day in comparison to its supply.

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