MAJOR PROJECT REPORT

ON

HYDRO ELECTRICITY GENRATION & MICRO GRID

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In

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Abstract

Hydro power plants convert potential energy of water into electricity. It is a clean source of energy .The water after generating electrical power is available for irrigation and other purposes. The first use of moving water to produce electricity was a waterwheel on the Fox River in Wisconsin in 1882. Hydropower continued to play a major role in the expansion of electrical service early in this century around the world. Hydroelectric power plants generate from few kW to thousands of MW. They are classified as micro hydro power plants for the generating capacity less than 100 KW. Hydroelectric power plants are much more reliable and efficient as a renewable and clean source than the fossil fuel power plants. This resulted in upgrading of small to medium sized hydroelectric generating stations wherever there was an adequate supply of moving water and a need for electricity. As electricity demand soared in the middle of this century and the efficiency of coal and oil fuelled power plants increased, small hydro plants fell out of favour. Mega projects of hydro power plants were developed. The majority of these power plants involved large dams, which flooded big areas of land to provide water storage and therefore a constant supply of electricity. In recent years, the environmental impacts of such large hydro projects are being identified as a cause for concern.

Acknowledgement

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1.1 INTRODUCTION

Hydroelectric Power -- what is it? It=s a form of energy … a renewable resource. Hydropower provides about 96 percent of the renewable energy in the United States. Other renewable resources include geothermal, wave power, tidal power, wind power, and solar power. Hydroelectric power plants do not use up resources to create electricity nor do they pollute the air, land, or water, as other power plants may. Hydroelectric power has played an important part in the development of this Nation's electric power industry. Both small and large hydroelectric power developments were instrumental in the early expansion of the electric power industry. Hydroelectric power comes from flowing water … winter and spring runoff from mountain streams and clear lakes. Water, when it is falling by the force of gravity, can be used to turn turbines and generators that produce electricity. Hydroelectric power is important to our Nation. Growing populations and modern technologies require vast amounts of electricity for creating, building, and expanding. In the 1920's, hydroelectric plants supplied as much as 40 percent of the electric energy produced. Although the amount of energy produced by this means has steadily increased, the amount produced by other types of powerplants has increased at a faster rate and hydroelectric power presently supplies about 10 percent of the electrical generating capacity of the United States. Hydropower is an essential contributor in the national power grid because of its ability to respond quickly to rapidly varying loads or system disturbances, which base load plants with steam systems powered by combustion or nuclear processes cannot accommodate. Reclamation=s 58 powerplants throughout the Western United States produce an average of 42 billion kWh (kilowatt-hours) per year, enough to meet the residential needs of more than 14 million people. This is the electrical energy equivalent of about 72 million barrels of oil. Hydroelectric powerplants are the most efficient means of producing electric energy. The efficiency of today's hydroelectric plant is about 90 percent. Hydroelectric plants do not create air pollution, the fuel--falling water--is not consumed, projects have long lives relative to other forms of energy generation, and hydroelectric generators respond quickly to changing system conditions. These favorable characteristics continue to make hydroelectric projects attractive sources of electric power.

1.2 HOW HYDROPOWER WORKS

Hydroelectric power comes from water at work, water in motion. It can be seen as a form of solar energy, as the sun powers the hydrologic cycle which gives the earth its water. In the hydrologic cycle, atmospheric water reaches the earth=s surface as precipitation. Some of this water evaporates, but much of it either percolates into the soil or becomes surface runoff. Water from rain and melting snow eventually reaches ponds, lakes, reservoirs, or oceans where evaporation is constantly occurring.

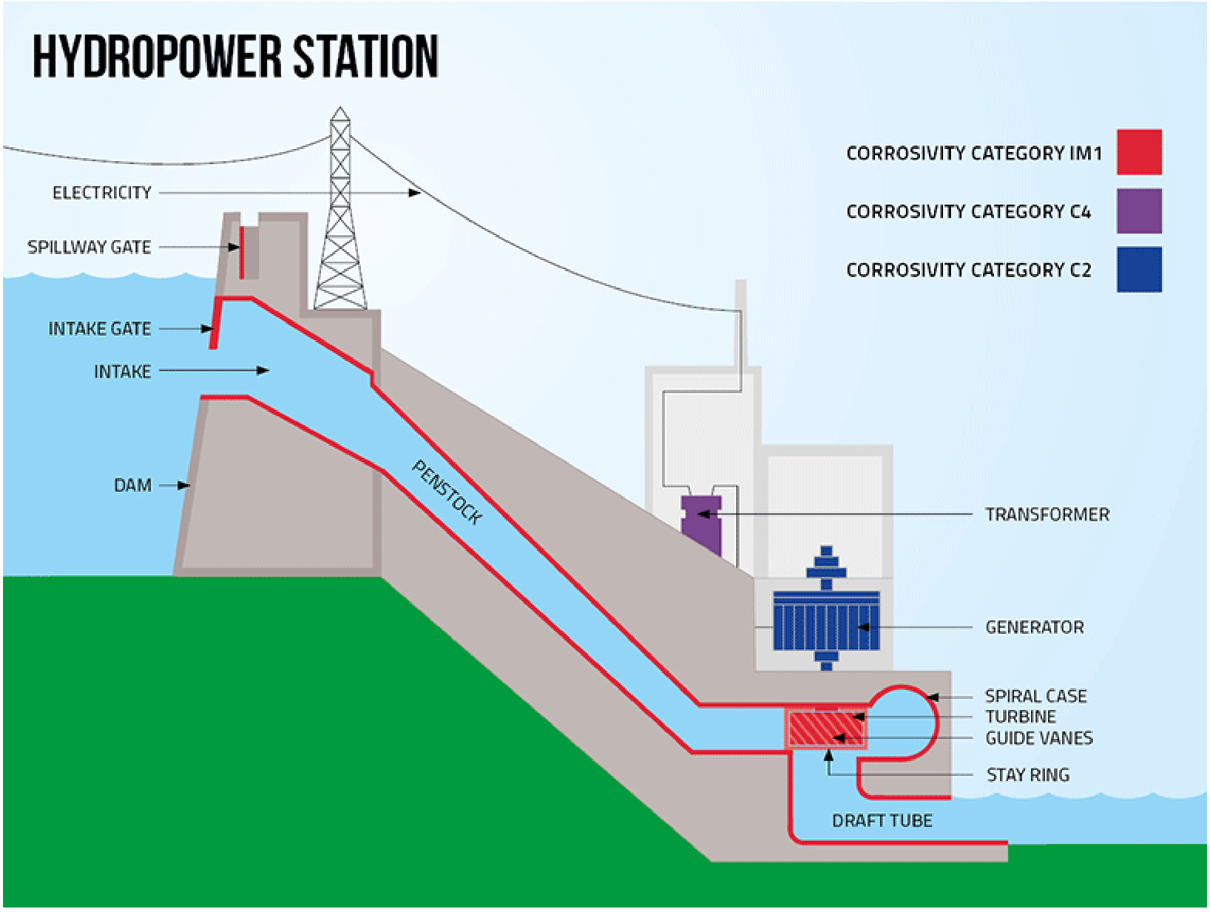

Fig. 1.1 Basic hydropower station

Moisture percolating into the soil may become ground water (subsurface water), some of which also enters water bodies through springs or underground streams. Ground water may move upward through soil during dry periods and may return to the atmosphere by evaporation. Water vapor passes into the atmosphere by evaporation then circulates, condenses into clouds, and some returns to earth as precipitation. Thus, the water cycle is complete. Nature ensures that water is a renewable resource. Generating Power In nature, energy cannot be created

1.3 Generating Power

In nature, energy cannot be created or destroyed, but its form can change. In generating electricity, no new energy is created. Actually one form of energy is converted to another form. To generate electricity, water must be in motion. This is kinetic (moving) energy. When flowing water turns blades in a turbine, the form is changed to mechanical (machine) energy. The turbine turns the generator rotor which then converts this mechanical energy into another energy form -- electricity. Since water is the initial source of energy, we call this hydroelectric power or hydropower for short. At facilities called hydroelectric powerplants, hydropower is generated. Some powerplants are located on rivers, streams, and canals, but for a reliable water supply, dams are needed. Dams store water for later release for such purposes as irrigation, domestic and industrial use, and power generation. The reservoir acts much like a battery, storing water to be released as needed to generate power. The dam creates a Ahead@ or height from which water flows. A pipe (penstock) carries the water from the reservoir to the turbine. The fast-moving water pushes the turbine blades, something like a pinwheel in the wind. The waters force on the turbine blades turns the rotor, the moving part of the electric generator. When coils of wire on the rotor sweep past the generator=s stationary coil (stator), electricity is produced. This concept was discovered by Michael Faraday in 1831 when he found that electricity could be generated by rotating magnets within copper coils. When the water has completed its task, it flows on unchanged to serve other needs

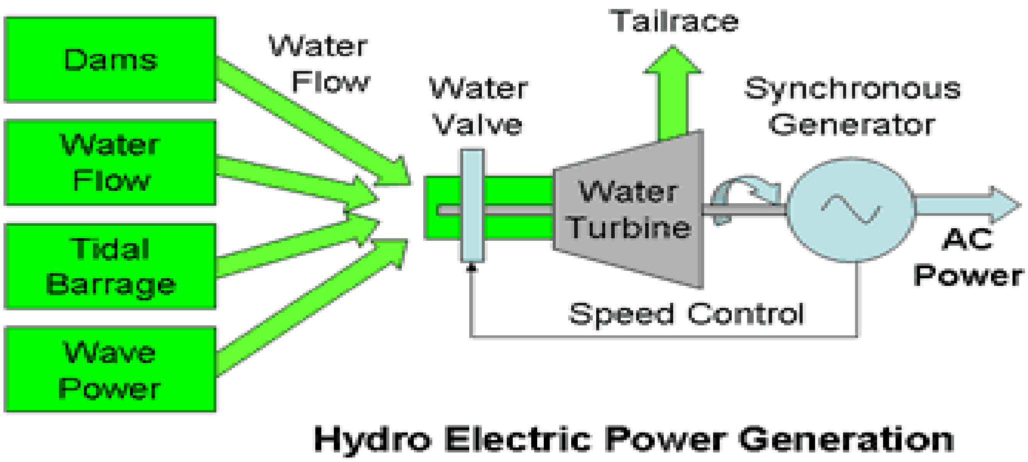

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Fig.1.2 Generating power

1.4 Transmitting Power

Once the electricity is produced, it must be delivered to where it is needed -- our homes, schools, offices, factories, etc. Dams are often in remote locations and power must be transmitted over some distance to its users. Vast networks of transmission lines and facilities are used to bring electricity to us in a form we can use. All the electricity made at a powerplant comes first through transformers which raise the voltage so it can travel long distances through powerlines. (Voltage is the pressure that forces an electric current through a wire.) At local substations, transformers reduce the voltage so electricity can be divided up and directed throughout an area. Transformers on poles (or buried underground, in some neighborhoods) further reduce the electric power to the right voltage for appliances and use in the home. When electricity gets to our homes, we buy it by the kilowatt-hour, and a meter measures how much we use.

While hydroelectric powerplants are one source of electricity, other sources include powerplants that burn fossil fuels or split atoms to create steam which in turn is used to generate power. Gasturbine, solar, geothermal, and wind-powered systems are other sources. All these powerplants may use the same system of transmission lines and stations in an area to bring power to you. By use of this Apower grid," electricity can be interchanged among several utility systems to meet varying demands. So the electricity lighting your reading lamp now may be from a hydroelectric powerplant, a wind generator, a nuclear facility, or a coal, gas, or oil-fired powerplant … or a combination of these.

The area where you live and its energy resources are prime factors in determining what kind of power you use. For example, in Washington State hydroelectric powerplants provided approximately 80 percent of the electrical power during 2002. In contrast, in Ohio during the same year, almost 87 percent of the electrical power came from coal-fired powerplants due to the area=s ample supply of coal. Electrical utilities range from large systems serving broad regional areas to small power companies serving individual communities. Most electric utilities are investor-owned (private) power companies. Others are owned by towns, cities, and rural electric associations. Surplus power produced at facilities owned by the Federal Government is marketed to preference power customers (A customer given preference by law in the purchase of federally generated electrical energy which is generally an entity which is nonprofit and publicly financed.) by the Department of Energy through its power marketing administrations.

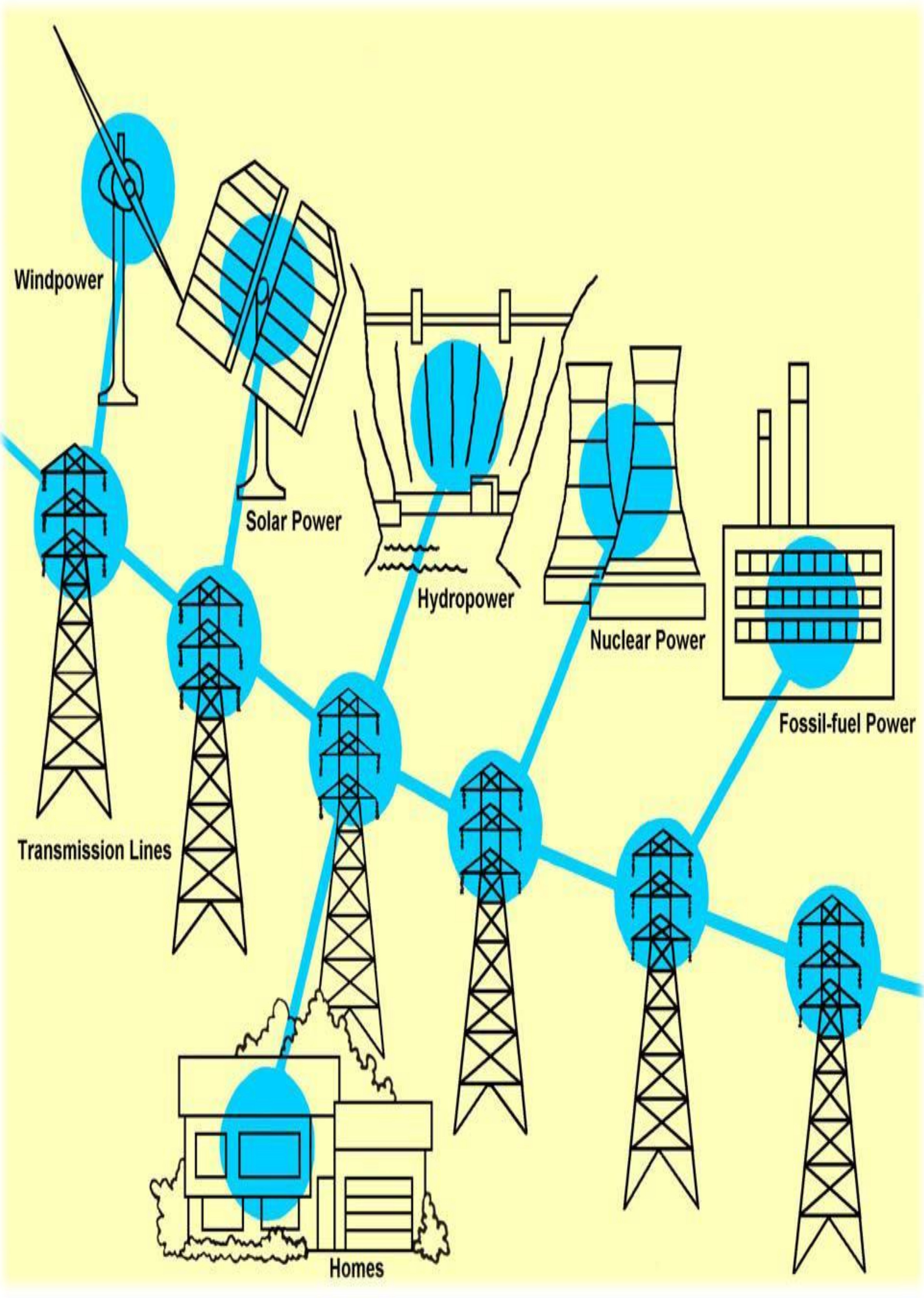

Fig.1.3 Transmitting power

1.5 How Power is Computed

Before a hydroelectric power site is developed, engineers compute how much power can be produced when the facility is complete. The actual output of energy at a dam is determined by the volume of water released (discharge) and the vertical distance the water falls (head). So, a given amount of water falling a given distance will produce a certain amount of energy. The head and the discharge at the power site and the desired rotational speed of the generator determine the type of turbine to be used. The head produces a pressure (water pressure), and the greater the head, the greater the pressure to drive turbines. This pressure is measured in pounds of force (pounds per square inch). More head or faster flowing water means more power. To find the theoretical horsepower (the measure of mechanical energy) from a specific site, this formula is used: THP = (Q x H)/8.8 where: THP = theoretical horsepower Q = flow rate in cubic feet per second (cfs) H = head in feet 8.8 = a constant A more complicated formula is used to refine the calculations of this available power. The formula takes into account losses in the amount of head due to friction in the penstock and other variations due to the efficiency levels of mechanical devices used to harness the power. To find how much electrical power we can expect, we must convert the mechanical measure (horsepower) into electrical terms (watts). One horsepower is equal to 746 watts (U.S. measure).

1.6 Turbines

While there are only two basic types of turbines (impulse and reaction), there are many variations. The specific type of turbine to be used in a powerplant is not selected until all operational studies and cost estimates are complete. The turbine selected depends largely on the site conditions. A reaction turbine is a horizontal or vertical wheel that operates with the wheel completely submerged, a feature which reduces turbulence. In theory, the reaction turbine works like a rotating lawn sprinkler where water at a central point is under pressure and escapes from the ends of the blades, causing rotation. Reaction turbines are the type most widely used.

An impulse turbine is a horizontal or vertical wheel that uses the kinetic energy of water striking its buckets or blades to cause rotation. The wheel is covered by a housing and the buckets or blades are shaped so they turn the flow of water about 170 degrees inside the housing. After turning the blades or buckets, the water falls to the bottom of the wheel housing and flows out.

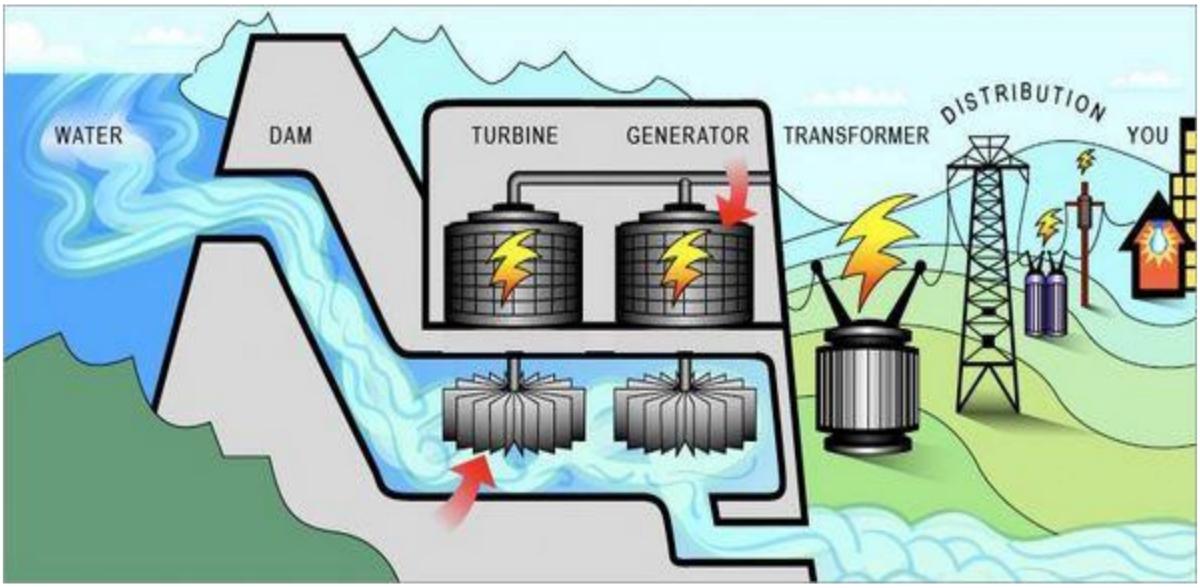

Fig.1.4 Hydro turbine

1.7 Modern Concepts and Future Role

Hydropower does not discharge pollutants into the environment; however, it is not free from adverse environmental effects. Considerable efforts have been made to reduce environmental problems associated with hydropower operations, such as providing safe fish passage and improved water quality in the past decade at both Federal facilities and non-Federal facilities licensed by the Federal Energy Regulatory Commission. Efforts to ensure the safety of dams and the use of newly available computer technologies to optimize operations have provided additional opportunities to improve the environment. Yet, many unanswered questions remain about how best to maintain the economic viability of hydropower in the face of increased demands to protect fish and other environmental resources. Reclamation actively pursues research and development (R&D) programs to improve the operating efficiency and the environmental performance of hydropower facilities.

Hydropower research and development today is primarily being conducted in the following areas: Fish Passage, Behavior, and Response Turbine-Related Projects Monitoring Tool Development Hydrology Water Quality Dam Safety Operations & Maintenance Water Resources Management Reclamation continues to work to improve the reliability and efficiency of generating hydropower. Today, engineers want to make the most of new and existing facilities to increase production and efficiency. Existing hydropower concepts and approaches include: -- Uprating existing powerplants -- Developing small plants (low-head hydropower) -- Peaking with hydropower -- Pumped storage -- Tying hydropower to other forms of energy.

1.8 Uprating

The uprating of existing hydroelectric generator and turbine units at powerplants is one of the most immediate, cost-effective, and environmentally acceptable means of developing additional electric power. Since 1978, Reclamation has pursued an aggressive uprating program which has added more than 1,600,000 kW to Reclamation's capacity at an average cost of $69 per kilowatt. This compares to an average cost for providing new peaking capacity through oil-fired generators of more than $400 per kilowatt. Reclamation's uprating program has essentially provided the equivalent of another major hydroelectric facility of the approximate magnitude of Hoover Dam and Powerplant at a fraction of the cost and impact on the environment when compared to any other means of providing new generation capacity.

Low-head Hydropower

A low-head dam is one with a water drop of less than 65 feet and a generating capacity less than 15,000 kW. Large, high-head dams can produce more power at lower costs than low-head dams, but construction of large dams may be limited by lack of suitable sites, by environmental considerations, or by economic conditions. In contrast, there are many existing small dams and drops in elevation along canals where small generating plants could be installed. New low-head dams could be built to increase output as well. The key to the usefulness of such units is their ability to generate power near where it is needed, reducing the power inevitably lost during transmission.

1.9 Peaking with Hydropower

Demands for power vary greatly during the day and night. These demands vary considerably from season to season, as well. For example, the highest peaks are usually found during summer daylight hours when air conditioners are running. Nuclear and fossil fuel plants are not efficient for producing power for the short periods of increased demand during peak periods. Their operational requirements and their long startup times make them more efficient for meeting baseload needs. Since hydroelectric generators can be started or stopped almost instantly, hydropower is more responsive than most other energy sources for meeting peak demands. Water can be stored overnight in a reservoir until needed during the day, and then released through turbines to generate power to help supply the peakload demand. This mixing of power sources offers a utility company the flexibility to operate steam plants most efficiently as base plants while meeting peak needs with the help of hydropower. This technique can help ensure reliable supplies and may help eliminate brownouts and blackouts caused by partial or total power failures. Today, many of Reclamation=s 58 powerplants are used to meet peak electrical energy demands, rather than operating around the clock to meet the total daily demand. Increasing use of other energy-producing powerplants in the future will not make hydroelectric powerplants obsolete or unnecessary. On the contrary, hydropower can be even more important. While nuclear or fossil-fuel powerplants can provide baseloads, hydroelectric powerplants can deal more economically with varying peakload demands. This is a job they are well suited for.

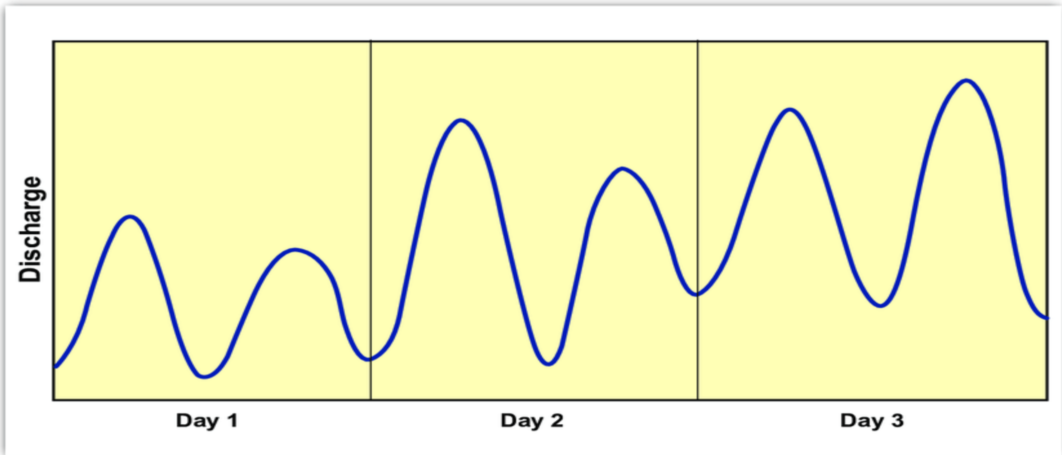

Fig.1.5 Peaking with hydropower

1.10 Pumped Storage

Like peaking, pumped storage is a method of keeping water in reserve for peak period power demands. Pumped storage is water pumped to a storage pool above the powerplant at a time when customer demand for energy is low, such as during the middle of the night. The water is then allowed to flow back through the turbine-generators at times when demand is high and a heavy load is place on the system. The reservoir acts much like a battery, storing power in the form of water when demands are low and producing maximum power during daily and seasonal peak periods. An advantage of pumped storage is that hydroelectric generating units are able to start up quickly and make rapid adjustments in output. They operate efficiently when used for one hour or several hours. Because pumped storage reservoirs are relatively small, construction costs are generally low compared with conventional hydropower facilities.

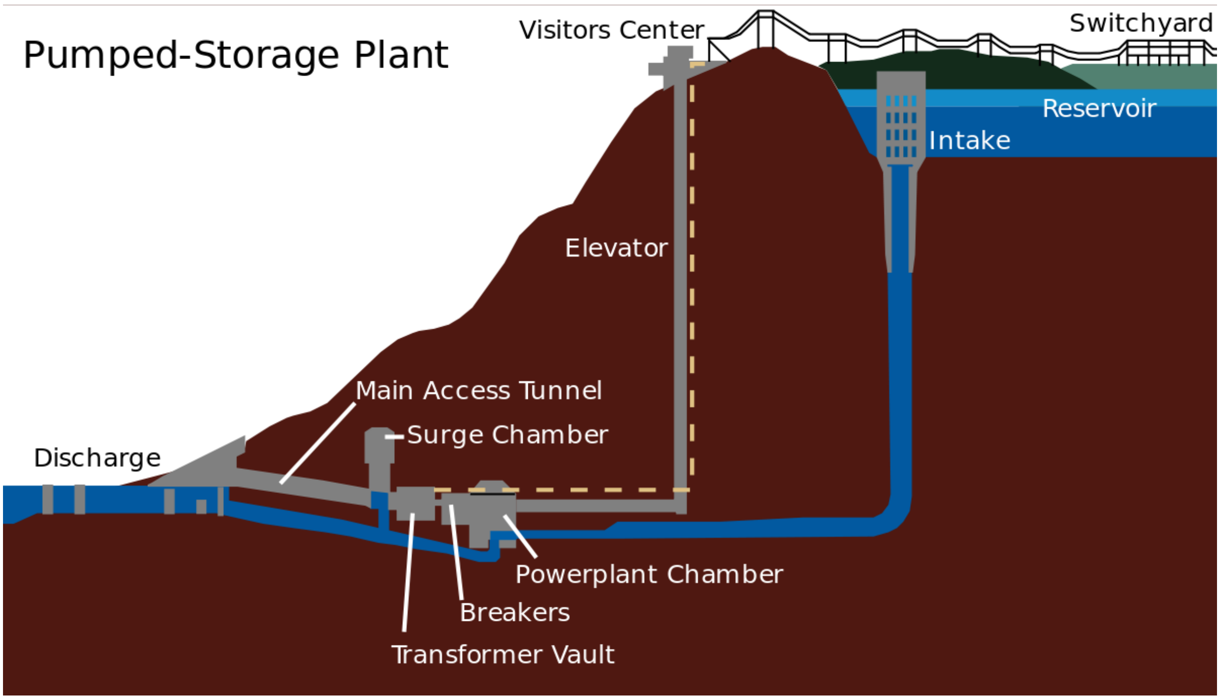

Fig.1.6 Pumped storage

1.11 Tying Hydropower to Other Energy Forms

When we hear the term Asolar energy,” we usually think of heat from the sun=s rays which can be put to work. But there are other forms of solar energy. Just as hydropower is a form of solar energy, so too is windpower. In effect, the sun causes the wind to blow by heating air masses that rise, cool, and sink to earth again. Solar energy in some form is always at work -- in rays of sunlight, in air currents, and in the water cycle. Solar energy, in its various forms, has the potential of adding significant amounts of power for our use. The solar energy that reaches our planet in a single week is greater than that contained in all of the earth=s remaining coal, oil, and gas resources. However, the best sites for collecting solar energy in various forms are often far removed from people, their homes, and work places. Building thousands of miles of new transmission lines would make development of the power too costly. Because of the seasonal, daily, and even hourly changes in the weather, energy flow from the wind and sun is neither constant nor reliable. Peak production times do not always coincide with high power demand times. To depend on the variable wind and sun as main power sources would not be acceptable to most American lifestyles. Imagine having to wait for the wind to blow to cook a meal or for the sun to come out from behind a cloud to watch television! As intermittent energy sources, solar power and wind power must be tied to major hydroelectric power systems to be both economical and feasible. Hydropower can serve as an instant backup and to meet peak demands. Linking windpower and hydropower can add to the Nation=s supply of electrical energy. Large wind machines can be tied to existing hydroelectric powerplants. Wind power can be used, when the wind is blowing, to reduce demands on hydropower. That would allow dams to save their water for later release to generate power in peak periods. The benefits of solar power and wind power are many. The most valuable feature of all is the replenishing supply of these types of energy. As long as the sun shines and the wind blows, these resources are truly renewable.

1.12 Hydropower, the Environment, and Society

It is important to remember that people, and all their actions, are part of the natural world. The materials used for building, energy, clothing, food, and all the familiar parts of our day-to-day world come from natural resources. Our surroundings are composed largely of the Abuilt environment@ -- structures and facilities built by humans for comfort, security, and well-being. As our built environment grows, we grow more reliant on its offerings. To meet our needs and support our built environment, we need electricity which can be generated by using the resources of natural fuels. Most resources are not renewable; there is a limited supply. In obtaining resources, it is often necessary to drill oil wells, tap natural gas supplies, or mine coal and uranium. To put water to work on a large scale, storage dams are needed. We know that any innovation introduced by people has an impact on the natural environment. That impact may be desirable to some, and at the same time, unacceptable to others. Using any source of energy has some environmental cost. It is the degree of impact on the environment that is crucial. Some human activities have more profound and lasting impacts than others. Techniques to mine resources from below the earth may leave long-lasting scars on the landscape. Oil wells may detract from the beauty of open, grassy fields. Reservoirs behind dams may cover picturesque valleys. Once available, use of energy sources can further impact the air, land, and water in varying degrees.

1.13 HYDROPOWER -- FROM PAST TO PRESENT

By using water for power generation, people have worked with nature to achieve a better lifestyle. The mechanical power of falling water is an age-old tool. As early as the 1700's, Americans recognized the advantages of mechanical hydropower and used it extensively for milling and pumping. By the early 1900's, hydroelectric power accounted for more than 40 percent of the Nation=s supply of electricity. In the West and Pacific Northwest, hydropower provided about 75 percent of all the electricity consumed in the 1940's. With the increase in development of other forms of electric power generation, hydropower=s percentage has slowly declined to about 10 percent. However, many activities today still depend on hydropower. Niagra Falls was the first of the American hydroelectric power sites developed for major generation and is still a source of electric power today. Power from such early plants was used initially for lighting, and when the electric motor came into being the demand for new electrical energy started its upward spiral. The Federal Government became involved in hydropower production because of its commitment to water resource management in the arid West. The waterfalls of the Reclamation dams make them significant producers of electricity. Hydroelectric power generation has long been an integral part of Reclamation=s operations while it is actually a byproduct of water development. In the early days, newly created projects lacked many of the modern conveniences, one of these being electrical power. This made it desirable to take advantage of the potential power source in water.

Chapter 2

Reservoir water level monitoring system

2.1 INTRODUCTION

Dams are the major sources of water supply to cities, they also play a vital role in flood control and can assist river navigation. Most of the dams are built to serve more than one purpose and their benefits are manifold. It is necessary to implement some sort of communication between the metering systems and computer models to provide support in managing the complex systems of the hydro power plants. Generally, the dams are monitored through traditional surveillance techniques and the water management except the monitoring of level of water in some of the dams which is automatized. Management of water resources through dams becomes complex as the number of users depending on dams is huge and these users may have conflicting interests. This situation gets much complex with the fact that the available resources are limited with high possibilities of droughts and floods. This affects the densely populated areas. Dam monitoring is a tedious and long term process which has to be improved step by step. A new system for dam water monitoring and management should be established which can provide water level in real time and can allow us to come to quick conclusions regarding the safety operations of the dams.

A dam in its lifetime, can be exposed to significant water level variations and seasonal environmental temperature changes. The most important factor in water supplying is to supply the required water quantity while maintaining a water head above a minimum limit. It is required to deliver the necessary quantity of water with the adequate pressure to the final consumers. The overhead storage tanks are built so that the water level could be kept at a constant value to maintain that pressure. The demand of the consumers is changing throughout the day and that leads to change the output flow rate of the tank. If water is supplied at a constant rate either over flow of water or pressure drops at end user may happen. This leads to the necessity of water level management.

2.2 IMPLEMENTATION

Determining the Level of Water

In the first stage we plan on getting the data on the level of water using ultrasonic sensors. The ultrasonic sensors are interfaced with a micro controller which give us the level of water.

2.3 Program

Embedded C is used to program the Arduino. The program used is as follows

```
void setup()

{

  pinMode(3, OUTPUT);

  pinMode(5, INPUT);

  pinMode(8, OUTPUT);

  pinMode(9, OUTPUT);

  pinMode(10, OUTPUT);

  pinMode(11, OUTPUT);

  Serial.begin(9600);

}


void loop()

{

  digitalWrite(3, LOW);

  delayMicroseconds(2);

  digitalWrite(3, HIGH);

  delayMicroseconds(10);
```

```
digitalWrite(3, LOW);

unsigned int a = pulseIn(5, HIGH);

unsigned int d = (a * 0.034) / 2;

Serial.println(d);

delay(100);

if (d <= 8)

{

  digitalWrite(8, HIGH);

  digitalWrite(9, LOW);

  digitalWrite(10, LOW);

  digitalWrite(11, LOW);

  delay(1000);

}

if (d <= 10 && d > 8)

{

  digitalWrite(8, LOW);

  digitalWrite(9, HIGH);

  digitalWrite(10, LOW);

  digitalWrite(11, LOW);

  delay(1000);

}

if (d <= 15 && d > 10)

{

  digitalWrite(9, LOW);
```

```
   digitalWrite(10, HIGH);
   digitalWrite(8, LOW);
   digitalWrite(11, LOW);
   delay(1000);
  }
  else
  {
   digitalWrite(10, LOW);
   digitalWrite(11, HIGH);
   digitalWrite(8, LOW);
   digitalWrite(9, LOW);
   delay(1000);
  }
}
```

2.4 Circuit diagram

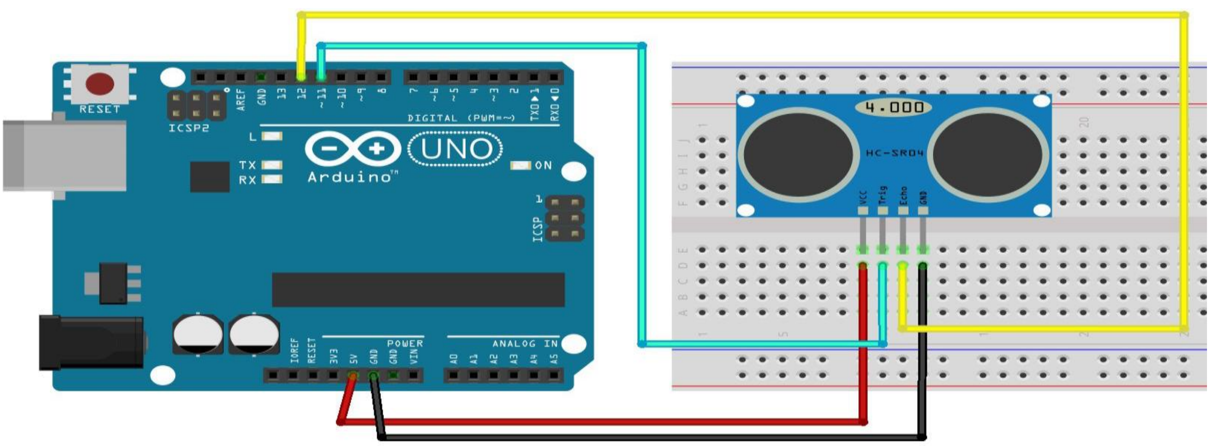

Fig 2.1 Basic circuit diagram

Arduino is interfaced with an Ultrasonic sensor to determine the water level of reservoir. The basic circuit diagram of interfacing is given above.

CHAPTER 3

Components required:-

3.1 Micro hydroturbine

Micro-hydro is a useful way of providing power to houses, workshops or villages that need an independent supply. For many remote areas beyond the reach of a national grid, micro-hydro is the only economic option. Where flow is limited, but high heads are available, the Pelton wheel is one of the most useful turbines. The Micro-hydro Pelton Turbine Manual is written to enable the reader to design and manufacture Pelton turbines with capacities from a few hundred Watts to around 100kw, though much of the information is relevant for larger units too.

Fig 3.1 Micro hydro turbine

3.2 Water pump

A **pump** is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action. Pumps can be classified into three major groups according to the method they use to move the fluid: *direct lift*, *displacement*, and *gravity* pumps.[1]

Pumps operate by some mechanism (typically reciprocating or rotary), and consume energy to perform mechanical work moving the fluid. Pumps operate via many energy sources, including manual operation, electricity, engines, or wind power, come in many sizes, from microscopic for use in medical applications to large industrial pumps.

Fig3.2 Water pump

3.3 Arduino

Arduino boards are available with many different types of built-in modules in it. Boards such as Arduino BT come with a built-in Bluetooth module, for wireless communication. These built-in modules can also be available separately which can then be interfaced (mounted) to it. These modules are known as Shield.

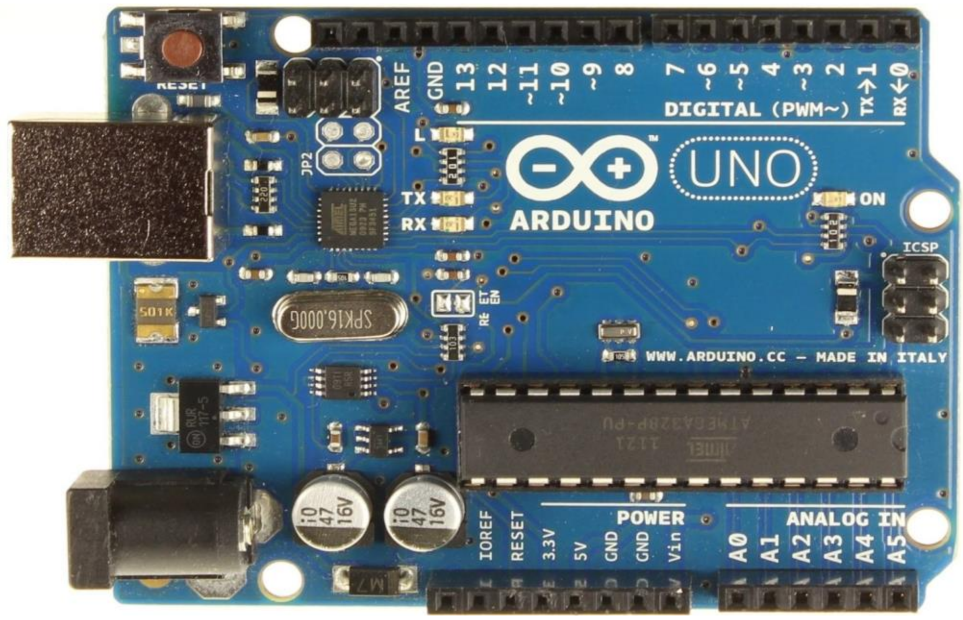

Fig3.3 Arduino uno

3.4 Ultrasonic sensor

Ultrasonic sensors work by emitting sound waves at a frequency too high for humans to hear. They then wait for the sound to be reflected back, calculating distance based on the time required. This is similar to how radar measures the time it takes a radio wave to return after hitting an object.

While some sensors use a separate sound emitter and receiver, it’s also possible to combine these into one package device, having an ultrasonic element alternate between emitting and receiving signals. This type of sensor can be manufactured in a smaller package than with separate elements, which is convenient for applications where size is at a premium.

While radar and ultrasonic sensors can be used for some of the same purposes, sound-based sensors are readily available—they can be had for just a couple dollars in some cases—and in certain situations, they may detect objects more effectively than radar.

Fig3.4 Ultrasonic sensor

3.5 LEDs

A **light-emitting diode** (**LED**) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor.[5] White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.[6]

Fig 3.5 LEDs

3.5 Buzzer

buzzer is a small yet efficient component to add sound features to our project/system. It is very small and compact 2-pin structure hence can be easily used on breadboard, Perf Board and even on PCBs which makes this a widely used component in most electronic applications.

There are two types are buzzers that are commonly available. The one shown here is a simple buzzer which when powered will make a Continuous Beeeeeeppp.... sound, the other type is called a readymade buzzer which will look bulkier than this and will produce a Beep. Beep. Beep. Sound due to the internal oscillating circuit present inside it. But, the one shown here is most widely used because it can be customised with help of other circuits to fit easily in our application.

This buzzer can be used by simply powering it using a DC power supply ranging from 4V to 9V. A simple 9V battery can also be used, but it is recommended to use a regulated +5V or +6V DC supply. The buzzer is normally associated with a switching circuit to turn ON or turn OFF the buzzer at required time and require interval.

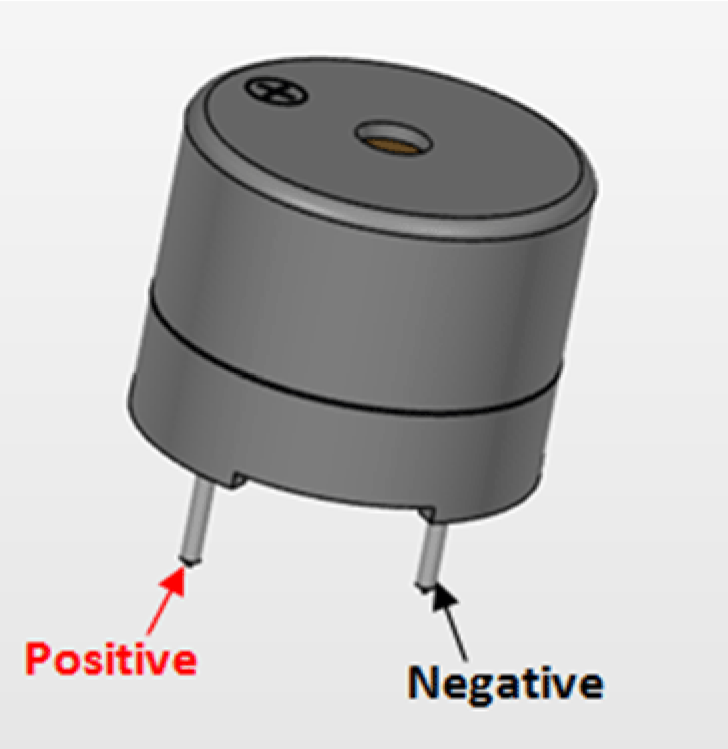

Fig 3.6 Buzzer

CONCLUSION

1. Hydropower is important from an operational standpoint as it needs no "ramp-up" time, as many combustion technologies do. Hydropower can increase or decrease the amount of power it is supplying to the system almost instantly to meet shifting demand. With this important load-following capability, peaking capacity and voltage stability attributes, hydropower plays a significant part in ensuring reliable electricity service and in meeting customer needs in a market driven industry. In addition, hydroelectric pumped storage facilities are the only significant way currently available to store electricity.
2. Water is one of the primary resource for human survival. But unfortunately a mammoth amount of water is being squandered by uncontrolled use. There are certain automated water level monitoring systems in practice but they are used for various applications and have some shortness in practice. We tried to suggest ways to tackle this problem and implement an efficient water level monitoring and management system

REFERENCES

1. Sreekar, Siddula & Bobba, Phaneendra & Jain, Prem. (2018). Water Level Monitoring and Management of Dams using IoT. 1-5. 10.1109/IoT-SIU.2018.8519843.
2. Wikipedia contributors. (2019, November 9). Arduino. In *Wikipedia, The Free Encyclopedia*. Retrieved 12:08, November 18, 2019, from https://en.wikipedia.org/w/index.php?title=Arduino&oldid=925375948
3. Wikipedia contributors. (2019, November 18). Hydropower. In *Wikipedia*, *The Free Encyclopedia*. Retrieved 12:09, November 18, 2019, from https://en.wikipedia.org/w/index.php?title=Hydropower&oldid=926675023
4. Wikipedia contributors. (2019, September 19). Ultrasonic transducer. In *Wikipedia, The Free Encyclopedia*. Retrieved 12:09, November 18, 2019, from https://en.wikipedia.org/w/index.php?title=Ultrasonic_transducer&oldid=916560201
5. Wikipedia contributors. (2019, November 14). Light-emitting diode. In *Wikipedia, The Free Encyclopedia*. Retrieved 12:10, November 18, 2019, from https://en.wikipedia.org/w/index.php?title=Light-emitting_diode&oldid=926193869