

# Run of the River



(Max McCubbin, Bethany Miller,  
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# Hydroelectric Power

- Hydroelectric power has been around for thousands of years in the form of paddle wheels for the purpose of grinding grain
- Our nation's first use of hydroelectric power was in 1880 in Grand Rapids, Michigan
- The first hydroelectric power plant was constructed in 1882 in Appleton, Wisconsin

# Hydroelectric Power (cont.)

- Hydropower is considered the most important and widely used renewable source of energy
- Represents 20% of total electricity production
- The US is ranked tenth in hydroelectric use

# Why We Should Change

- The ideal source of power
- This is because it is almost free and always available, there are no waste products, and the absence of air or water pollution

# Types of Hydropower Generation

## 1. Conventional

- Run of River
- Storage plants

## 2. Pumped Storage

# How Hydropower Works

This form of energy stems from using water's energy as it flows from higher to lower elevation, which rotates turbines to create electricity.



# How Hydroelectric Power Is Created

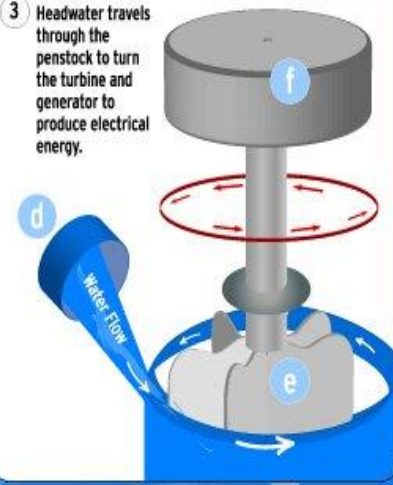
1. Dam creates a reservoir, which stores water.
2. Dam elevates the water, creating a drop.
3. Water in the forebay falls through the penstock to turn the turbine.
4. Generator is turned by the turbine to produce electricity.
5. Electricity is carried to homes and businesses by transmission lines.

## KEY

- a. Dam
- b. Headwater
- c. Forebay
- d. Penstock
- e. Turbine
- f. Generator
- g. Tail water
- h. Afterbay
- i. Distribution / transmission



- 3 Headwater travels through the penstock to turn the turbine and generator to produce electrical energy.



# Determining Available Power

$$\text{Power} = \text{Head} \times \text{Flow} \times \text{Gravity}$$

- Power – Watts
- Head – Meters
- Flow – Liters per second
- Gravity – Constant



# Our Project



- Use the water running over the dam
  - Convert it to hydroelectric power
- Produce free electricity for the Recycling center and firehouse

# Our Project (cont.)

Head – 3.048 meter  
drop

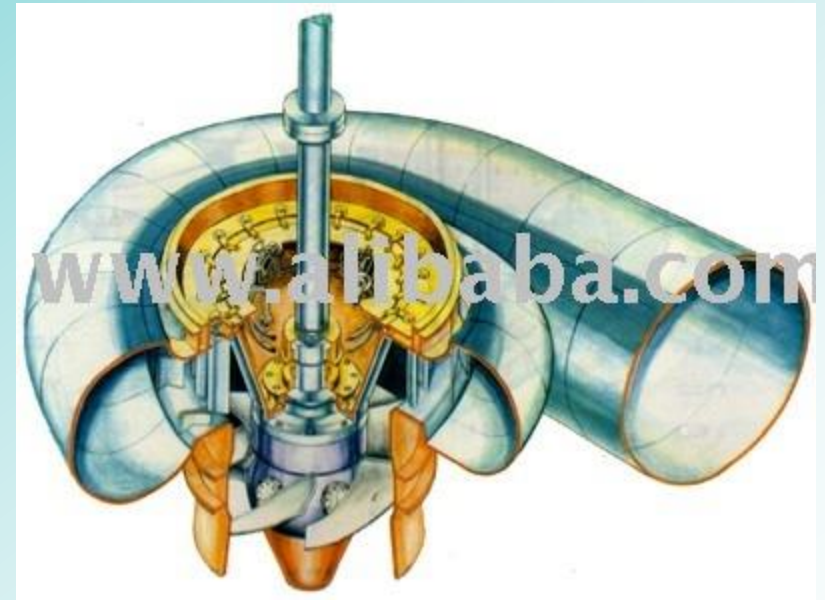
Flow – 94.6 liters flow  
over the dam per  
second

Power – 1700 watts



# Generator

Type	Radial Flow
Rated Head	3m
Rated Flow	85 m/sec
Power	3 kw
Efficiency	60%
Cost	\$1599.00
Lead Time	2 to 5 months
Manufacturer	Global Import



# Marketing Analysis

- There are no projects like our own underway in Kentucky
- We hope to make hydropower a more popular method of power throughout Kentucky

# Organization and Management

- We will develop design and overall layout
- The appointed city officials will need to hire electricians, engineers, and any other necessary personnel for the construction of the project



# Marketing and Sales Management

- Our customers will be the city of Hodgenville
- Get the idea out into the public by attending city functions
- Contact the local newspaper or radio
- Gain community support



# Service or Product Line

- Our method of producing energy has many benefits:
  - There is very little pollution
  - Greenhouse gas emissions are dramatically reduced
  - The water that is needed to run the system is provided free by nature
  - The maintenance and operation costs would be minimal
  - The Normal disadvantages do not apply to our situation

# Funding Request

- The city will mainly be responsible for the funding of the project
- Outside funding could include:
  - Private and public donations
  - Grants

# Financials

- Current electricity bills:
  - Recycling center - \$720
  - Fire house - \$540
- \$6000 total start up expenses include:
  - Price of equipment
  - Price of labor
- Target goal for outside funding is \$3000

# Financials (cont.)

- Payback period of 4.76 years
- With the help of outside funding, payback period will shorten
- All money saved is profit

# Benefits

- Saves the city money
- Cleaner, more environmentally friendly way to produce electricity
- Raises community awareness of “going green”

# Thank You!

- Martin and Lisa Williams
- Bobby Clark
- Mr. Roy Walker
- Mrs. Clarissa Thomas
- Jill Gray
- Jerry from the Water Treatment Plant
- All of our guest speakers