

Big Eau Pleine Economics

POWER GENERATION ECONOMIC IMPACT

According to the Wisconsin Valley Improvement Company (WVIC) website, its member companies own and operate 25 hydro generation plants on the Wisconsin River system. Together they generate one billion kilowatt hours per year of electricity. At 10 cents per KWH (the approximate residential service retail price from Wisconsin Public Service) **the hydropower generation electricity retail value is about \$100 million per year for the whole Wisconsin River system.** However, according to the WVIC “recent data shows that in Wisconsin hydropower is produced for less than 1 cent per KWH” to operate and maintain a hydro plant. So the real cost of this power to the owners of the hydro plants is under \$10 million per year (only 10% of its possible retail value). This cost savings is a tremendous economic benefit to the paper companies (New Page, Wausau Paper, Domtar) and utilities (Alliant Energy, Wisconsin Public Service) that own these hydro plants. (Source 4). Wouldn't we all love to own a business where you can make something for a penny and sell it for a dime!

How much is the water just from the Big Eau Pleine watershed worth in power generation to the whole Wisconsin River system? The Big Eau Pleine historically feeds an average of 258 CFS into the Wisconsin River at Lake DuBay. From the Lake DuBay dam on down through the 12 hydro plants to the Prairie DuSac dam there is an elevation drop of 310 feet. **This puts the value of the 258 CFS of water from just the Big Eau Pleine watershed at up to \$5 million per year in retail value of electricity generated. Remember it only 10% of this value is what it costs to operate and maintain the power plant or \$0.5 million per year. So the utilities and paper mills that own the hydro plants downstream see a huge positive economic impact of up to \$4.5 million per year from just the water out of the Big Eau Pleine.**

Even if there were no BEP reservoir, historically an average of 258 CFS of water would flow into Lake DuBay from the BEP watershed. With the BEP reservoir present and managed as it has been, a long-term average of 258 CFS flows into Lake DuBay. If the BEP reservoir were kept full all the time (perhaps if it had a hydro plant like the reservoirs on the river) there would still be a long term average of 258 CFS of water flowing into Lake DuBay. The BEP reservoir does not create or destroy water (although evaporation does come into play a little bit). It is a "fat" spot in the pipeline to store water for later use. The point is, **no matter what the level in the reservoir, all the water coming into the reservoir eventually goes down into Lake DuBay and can potentially generate the same amount of power.** So why not just keep the reservoir full all the time? The answer lies in the fact that 258 CFS is a long term average. Mother nature causes huge swings in the supply of water (rain and snow melt). And there is an "optimum range" of flow for the hydro plants to operate in to maximize power generation. Get the water flow outside that "optimum range" and less power is generated.

What is this "optimum range"? It is important to understand that the amount of power generated at a hydro plant is proportional to the amount of water going through the turbines in the hydro plant (CFS or cubic feet per second) times the height of the water (feet difference in the height of the water above to below the dam). **More water flow through a turbine X more height difference in the water at the dam = more electricity generated.** To get the most power generation for a given power plant there is an "optimum range" of flow desired on the river. Too little water flow and the hydro plant generates less power than its capacity. Too much flow and gates are opened to bypass some water around the turbines because they can't use it all. This can also cause the river level below the dam to rise and the "height difference" effect of the water is reduced.

HYDRO PLANT ON THE BIG EAU PLEINE DAM

The dollar values for nearby hydro plants in electrical generation at 10 cents/KWH are: Rothschild

\$2.4 million, Mosinee \$2.5 million, and DuBay \$4.6 million per year. I have calculated that **a dam on the Big Eau Pleine could have a power generating potential of up to \$500,000 per year.** This is based on the average flow of the Big Eau Pleine river back to 1914-(data from the USGS website) plus water from the rest of the Big Eau Pleine watershed totaling 258 CFS. A 31-foot elevation drop was used in the calculation. **A hydro generation plant on the Big Eau Pleine dam would be a tremendous incentive to keep the water level up,** since power generation is proportional to the height of the water behind the dam. This would be a huge benefit to the lake as a recreational resource. WVIC has said that the economics of the cost to build and maintain a hydro plant, weighed against the power generation benefit have been studied and are not good enough.

ANALYSIS

WVIC was set up as a corporation for the interests of its member companies, the paper mills and power companies. So what might happen if WVIC were to keep the BEP reservoir nearly full all summer to benefit recreational users and the lake environment, even if the weather is very dry? They could simply use that water later and still generate the same amount of electricity--right? Well-maybe. This could be true provided it did not rain too much in the fall and cause the river flow to get higher than the "optimum range" of flow for maximizing power generation at the hydro plant. In many of the recent drought years it did not rain much in the fall and no electric power generation would have been lost. The water could be used later rather than sooner since it does not just disappear. However this is an economic risk that WVIC is unwilling to take because it does not have to per their license to operate. If WVIC takes the economic risk of holding extra water back when it is dry, and loses, it costs money. Money in the form of generating less very cheap hydropower and having to replace that with more expensive electricity at market prices. This same analogy and argument can be applied to the reservoir draw down in the winter.

On the other side of the coin is the economic cost to the public who use the lake, and to the lake environment, when it is dry. This is the economic cost for lost recreational opportunities like boating and fishing, and for decreased property values, etc. WVIC can, per their license, draw the BEP flowage down more than 28 feet of the 31-foot dam height if it is dry, regardless of the economic cost to users of the BEP. **The way things are now all the risk of economic loss due to dry weather than CAN be shifted from WVIC to the public IS shifted to the public.** An example of this shifting economic risk due to drought just happened this past winter with the huge fish kill. WVIC does not take any of blame for this—they blame it on the drought and the pollution. After all they were operating within their license. The flowage could have been kept up higher in the summer for recreational use, but that adds risk to WVIC. Then when it didn't rain in the fall they could have continued to keep it up more going into the winter to reduce the risk to the fish, but that's risky and they didn't. The economic loss to the public due to the fish kill will now probably approach the above stated \$2 million per year for the central Wisconsin area just for fishing--with the destroyed fishery, who will come fish the BEP anytime soon? And what are the other negative economic impacts beyond just fishing costing the public?

The state's Public Trust Doctrine says "Wisconsin lakes and rivers are public resources, owned in common by all Wisconsin citizens under the state's Public Trust Doctrine. Based on the state constitution, this doctrine has been further defined by case law and statute. It declares that all navigable waters are "common highways and forever free", and held in trust by the Department of Natural Resources." (Source 5) **Did not the water from the BEP watershed truly belong to the public at one time? Why do WVIC companies get a virtual guarantee of a positive economic impact of \$4.5 million per year from the public waters of the BEP watershed to use WHEN they want for only their benefit? When the weather is dry, why does the public bear all the risk of economic loss that can be shifted? It is allowed the point of destroying the resources! Isn't power generation at less than once cent per KWH, using public water, a big giveaway of a public resource? Should this very cheap power be taxed with the revenue going toward fixing the problems of the BEP? Should not the WVIC companies be required to take on some of the "shift-able" economic risk to "improve public use" of the**

BEP reservoir and for protection of that resource....in exchange for use of the public's water and the tremendous economic benefit they get from very cheap hydro power generation?

It is understood that the BEP and the other reservoirs were initially constructed by, and entirely for the benefit of WVIC and its member companies and their employees. There was a heavy capital investment for dams and dikes and power plants many decades ago—which has paid and continues to pay tremendous returns. Things have changed. These reservoirs have become huge recreational resources, natural resources, and places where people live. Isn't there a compromise somewhere?

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Sources:

- 1) From an article called "The economics of shoreland protection" at. wisconsinlakes.org/AboutLakes/PDFs/EconomicsShorelandProtection.pdf. This article quoted their source as
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- 2) From netstate.com,
- 3) Lake Winnebago System experience. www.anrep.org/conferences/2008/abstracts/115-fishing-for-dollars-wisconsin2019s-lake-winnebago-system-experience.
- 4) WVIC website
- 5) dnr.wi.gov/org/water/wm/dsfm/shore/doctrine.htm