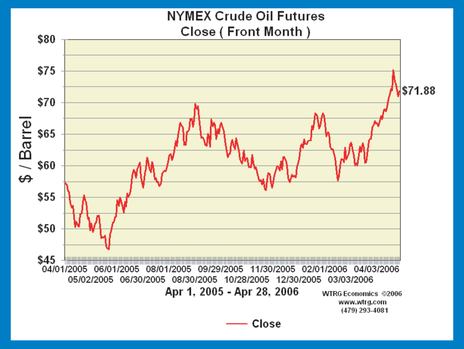
Hydropower in your Neighborhood?

IPRO 319: Feasability Assesment for Sustainable Hydroelectric Facilities in Northeastern Illinois

Problem:



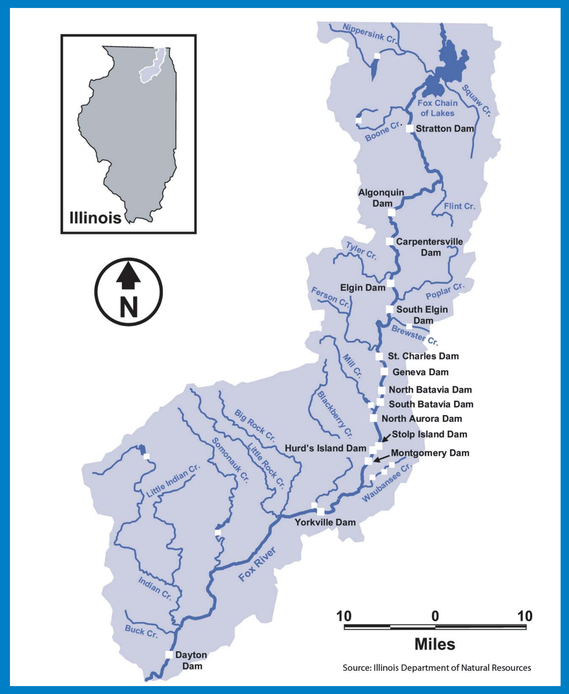
Rising Cost and Dependance upon Foreign Oil

Pollution within the Chicago Megalopolis

Proposal:

Utilitze Existing Dams on the Fox River to generate hydroelectricity as well as income for IIT.

Elgin, IL



14 Potential Sites

Strategy:

Determine feasability of converting one or more dams based upon the project's Economic Viablility, Stakeholders, Permitting and Certification processes.

Stakeholders:

Environmental Organizations: concerned with the safe passage of fish through the dam.

Power generated would be sold to ComEd under a Power Purchase Agreement (PPA).

Permitting/Certification:

Project Approval depends upon the following government organizations:

1. **USCOE** — U.S. Army Corp of Engineers
2. **IDNR/OWR** — Illinois Department of Natural Resources, Office of Water Resources
3. **IEPA** — Illinois Environmental Protection Agency
4. **FERC** — Federal Energy Regulatory Commission
5. **DOI** — U.S. Department of Interior

Joint Application

Average wating period for certification of Hydroelectric Facilities: 4-5 years

Economic Analysis:

Four sites are determined to have the most potential using the power equation:

$$P = \frac{\text{Head} \times \text{Flow}}{11.8} \times 0.75$$

Dam	Height ft	Q ft^3/s
Algonquin	10.5	525
South Elgin	13	910
Montgomery	8	396
Stolp Island	12	400

Case Studies:

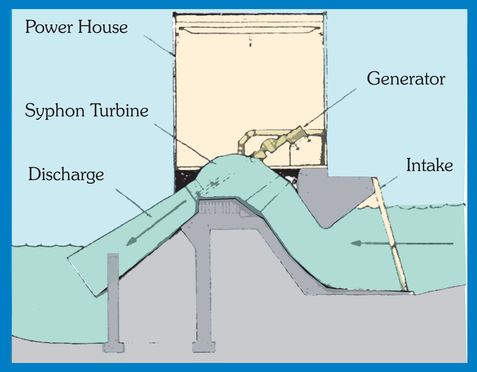
Kankakee Hydroelectric Plant

Constructed: 1991
Size: 6.5 MW
Construction Cost: $8,566,000

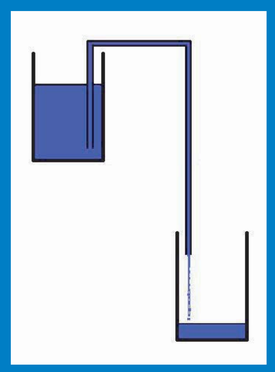
Starved Rock Hydroelectric Plant

Constructed: 1994
Size: 8.0 MW
Construction Cost: $22,000,000

The Technology:



The S-Type Turbine, a cheaper alternative to traditional hydroelectric turbines.



A Syphon Intake is particullarly well suited for low-head situations.

Results:

Of the Four sites, it was concluded that the Elgin Dam had the most profit potential.

Expected Output: .539 MW

Estimated Cost:

Turbine Generator	$1,190,000
Mechanical and Electrical Equipment	$920,000
Operation and Maintenance Cost	$50,000
Civil Work	$527,000
Administration	$127,000
Contingency	$421,000
Total:	$3,235,000
Grant from State of Illinois	-$1,000,000
Total:	$2,235,000

Cost per KW: $5532

Conclusion:

At this time, the Estimated Cost per KW is too high for dam conversion to be economically viable, HOWEVER:

- If The cost of fossil fuels continues to escalate,
- A strong PPA is negotiated with the Utility Company
- Cheaper and more efficient equipment is developed,
- The Public is made more aware of low head hydroelectric

A vast renewable resource could be tapped.

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