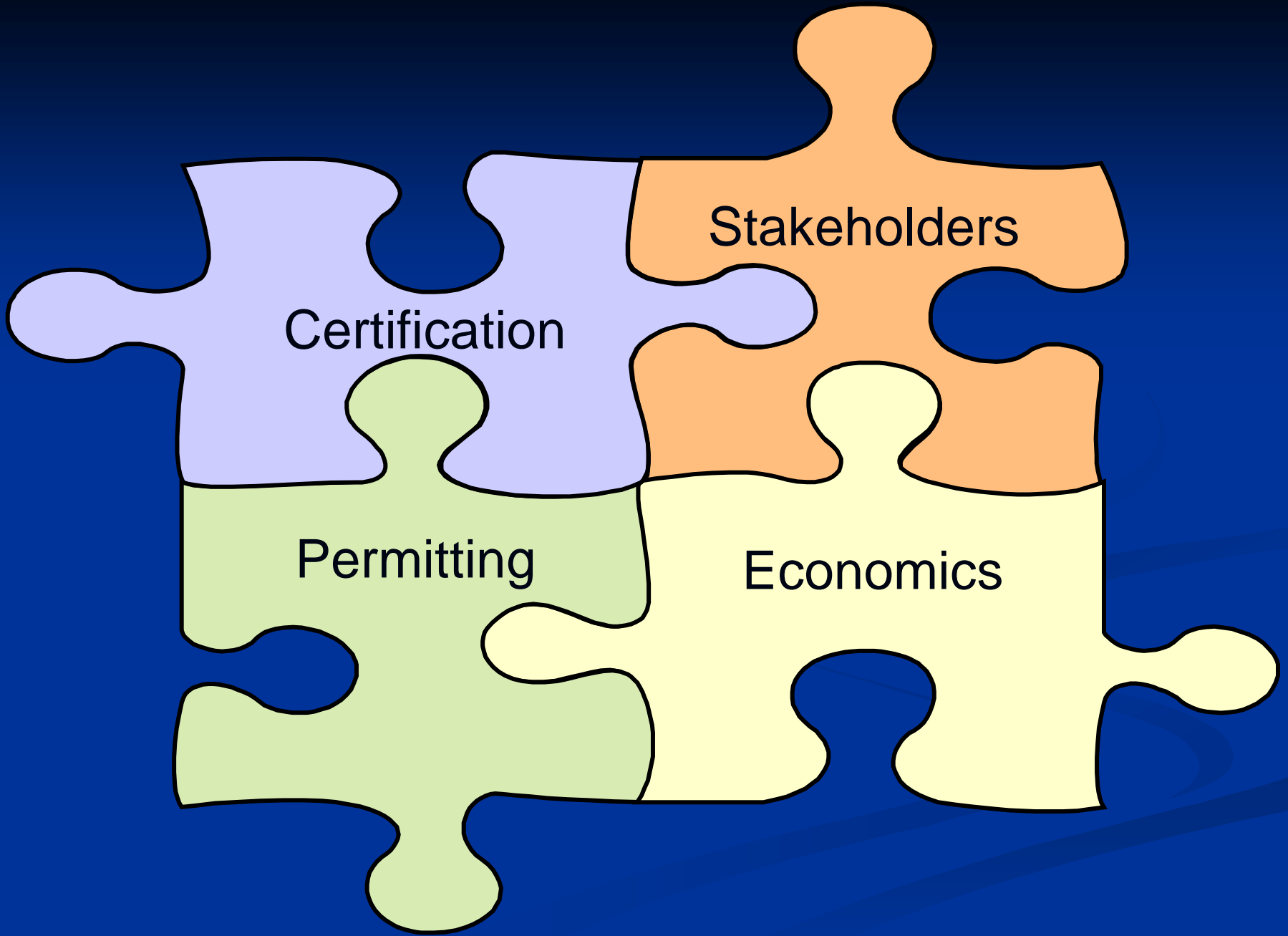


IPRO 319 – Feasibility Assessment of Sustainable Hydroelectric Facilities in Northeastern Illinois

That Dam IPRO

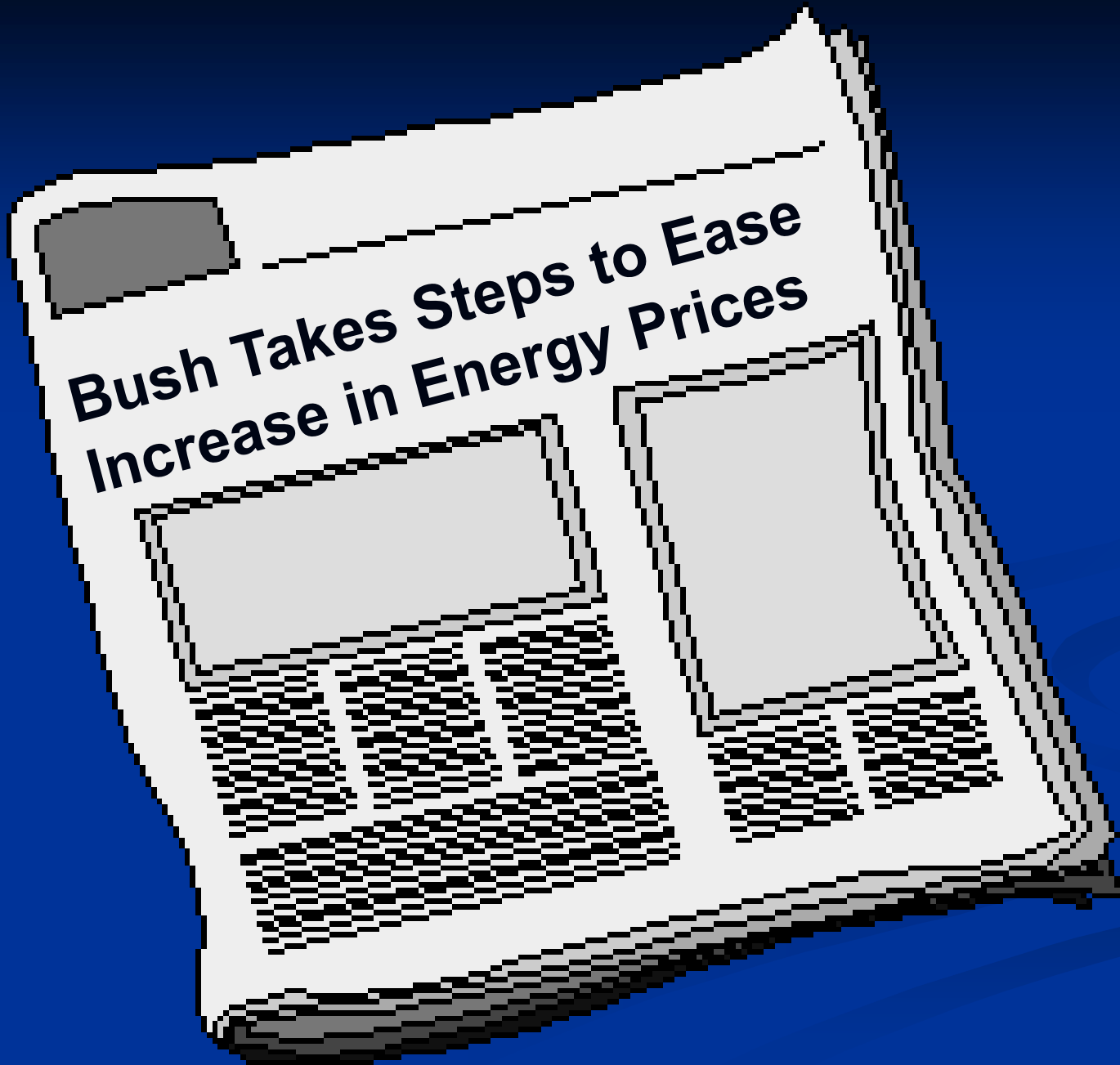


Certification

Stakeholders

Permitting

Economics





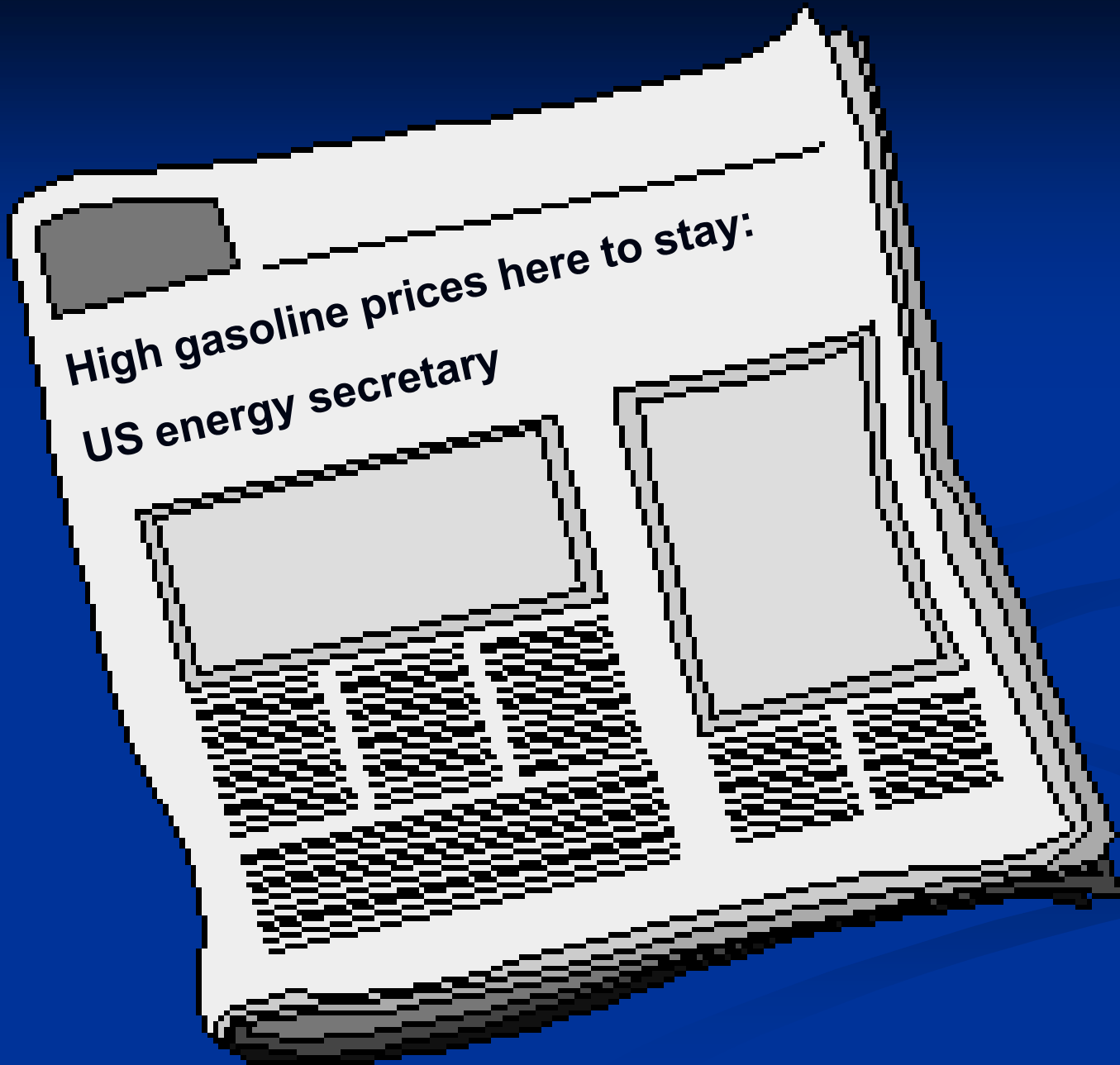
**Experts: Natural Gas Economy
Losing Steam**

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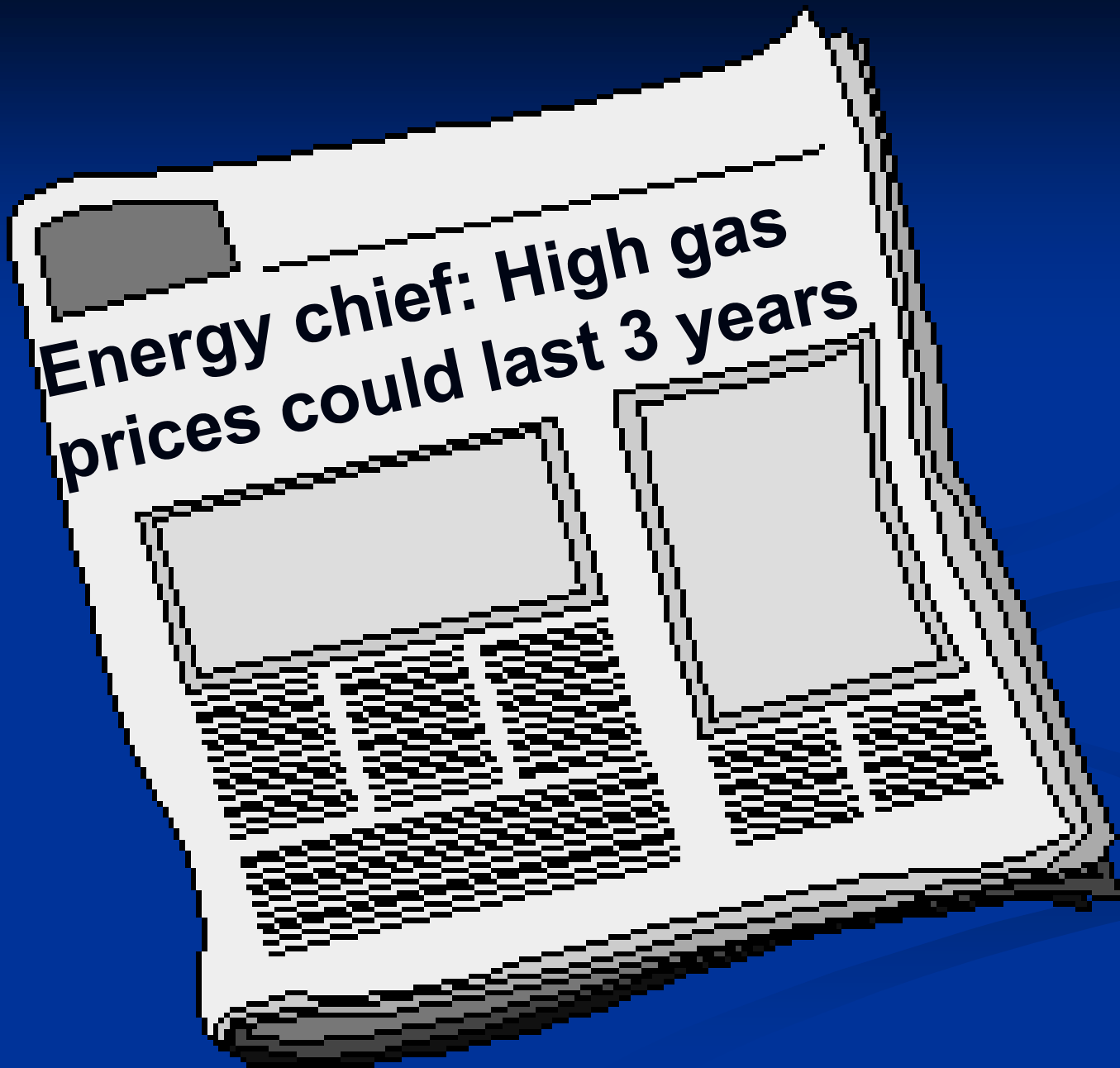
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High gasoline prices here to stay:
US energy secretary

High gasoline prices are here to stay, US energy secretary said Tuesday, warning that the current price surge is only the beginning of a long-term trend.

High gasoline prices are here to stay, US energy secretary said Tuesday, warning that the current price surge is only the beginning of a long-term trend.



Energy chief: High gas prices could last 3 years

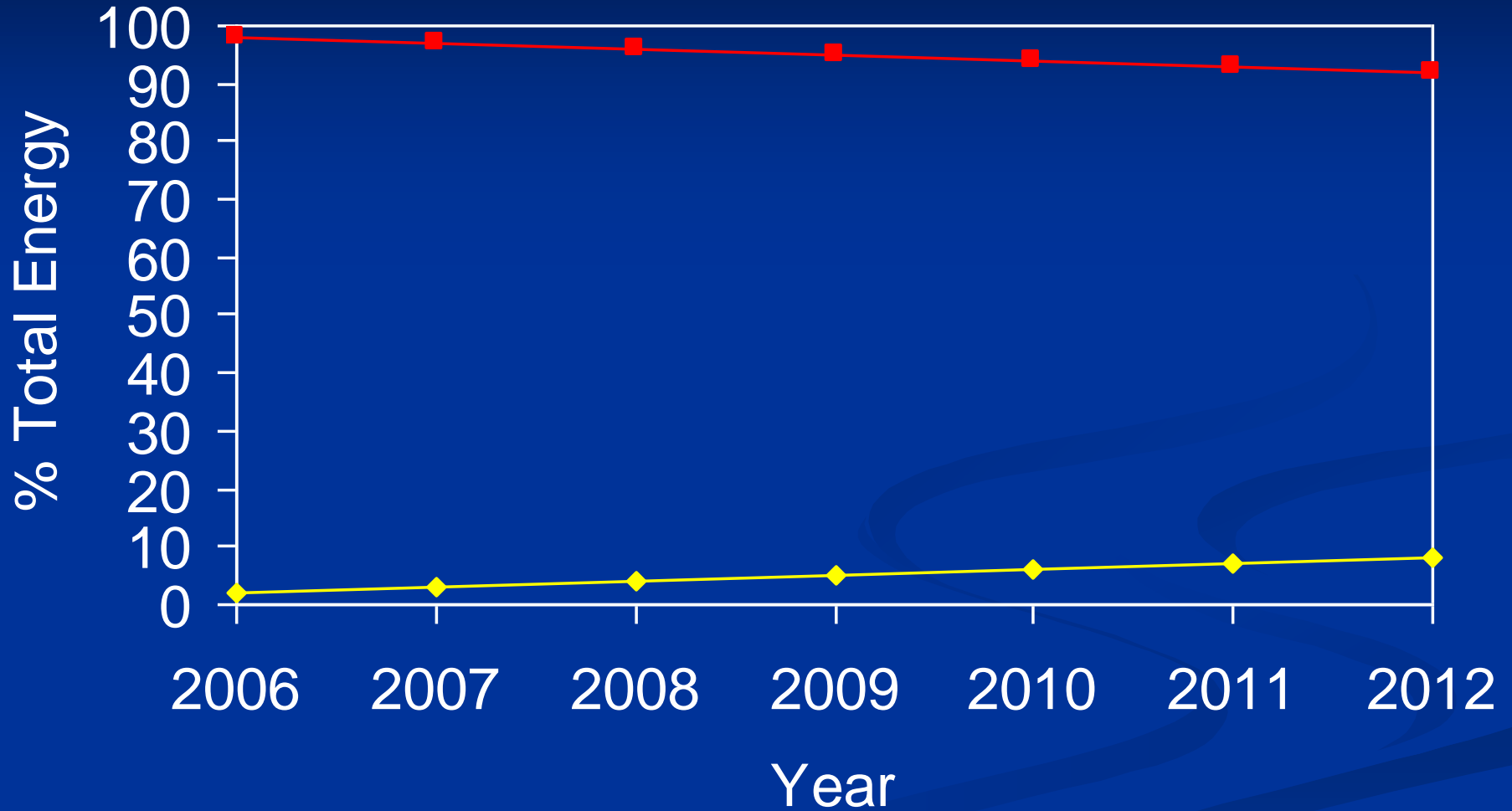


**Governor Blagojevich Sends
Sustainable Energy Plan to Illinois
Commerce Commission**

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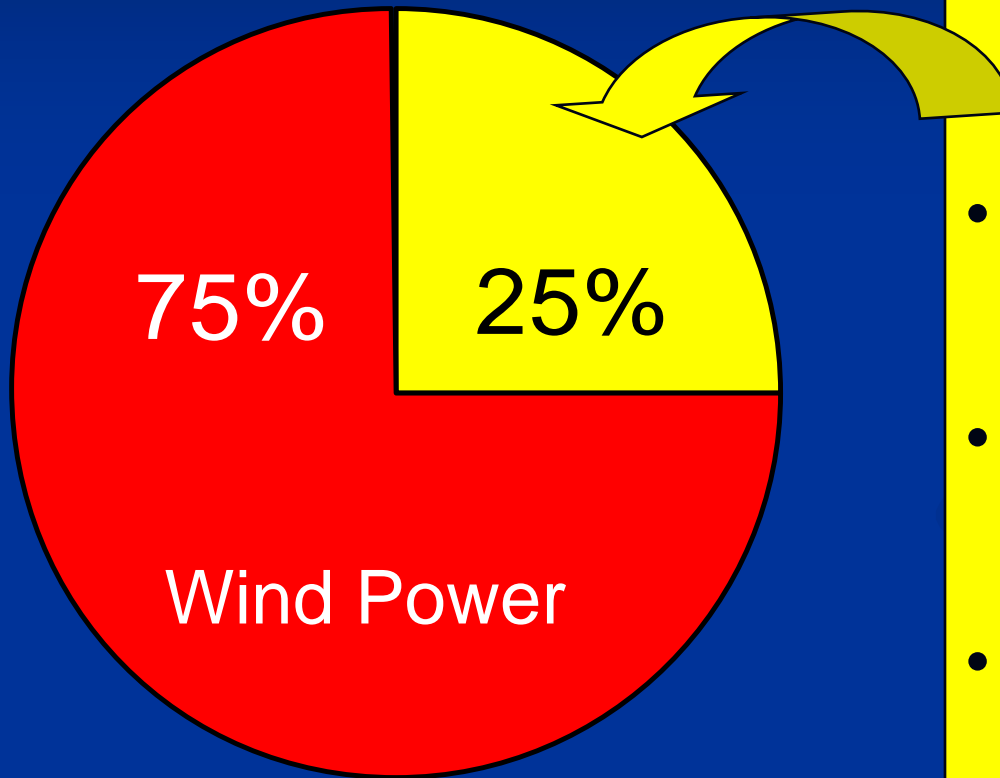
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Illinois Sustainable Energy Plan



◆ Renewable Energy ■ Non-Renewable Energy

Illinois Sustainable Energy Plan



- solar thermal energy
- photovoltaic cells and panels
- crops and organic waste biomass
- methane recovered from landfills
- **hydropower**

Concerns with Hydropower

- Affects water quality
- Changes river flow
- Harms fish
- Prevents recreation

EPA Green Power Partnership Program

- Green-e renewable resources
 - Eligible Hydro: 30 MW or less, or certified by the Low-Impact Hydro Institute (LIHI)
- Renewable Energy Certificates (REC)
“green tags”

Low-Impact Hydro Institute

- Certified hydropower facility criteria
 1. River flows
 2. Water quality
 3. Fish passage and protection
 4. Watershed protection
 5. Threatened and endangered species protection
 6. Cultural resource protection
 7. Recreation
 8. Facilities recommended for removal

Stakeholders



Stakeholders Cont.

- Environmental Groups and Objectives Identified
 - Sierra Club, Valley of Fox Group, Fiends of the Fox River, Fox River Ecosystem-Partnership, Illinois Smallmouth Alliance, etc.
 - Want dams removed or modified with fish passages and portages for recreation
 - Fish friendly turbine, eliminates the need for a fish passage



Stakeholders Cont.

- Owner of Dams and Support Identified
 - State Owned – Geneva
 - Proposals submitted to various state departments for approval
 - City Owned - Stolp Island & Elgin
 - Both support the project if it is feasible



Stakeholders Cont.

- Utility Company Identified
 - ComEd powers Elgin and Aurora
 - No Power Purchase Agreement available at this time
 - Geneva purchases its own power
 - Interested in hydroelectric power



State/Local Agencies

US Army Corp of
Engineers,
Chicago District

Illinois
Department of
Natural
Resources

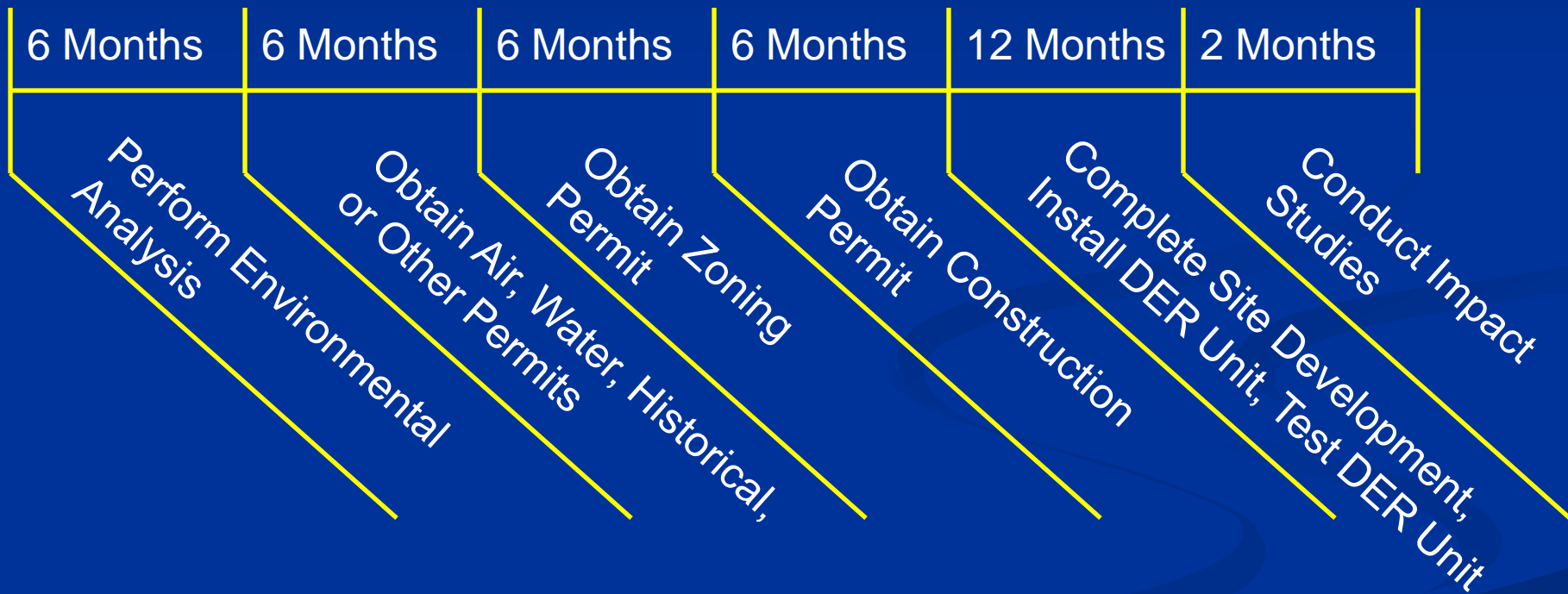
Illinois
Environmental
Protection
Agency

Federal Agencies

Federal
Energy
Regulatory
Commission

US Department
of Interior

Timeline of Permit Process



Economic Analysis Group

IDENTIFY THE GOAL

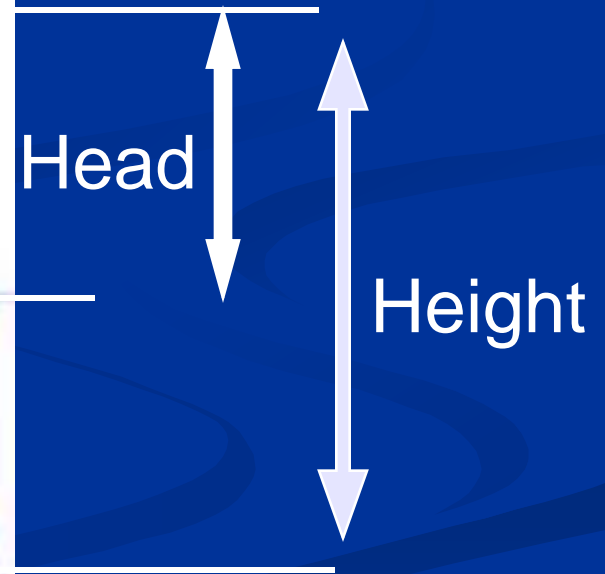
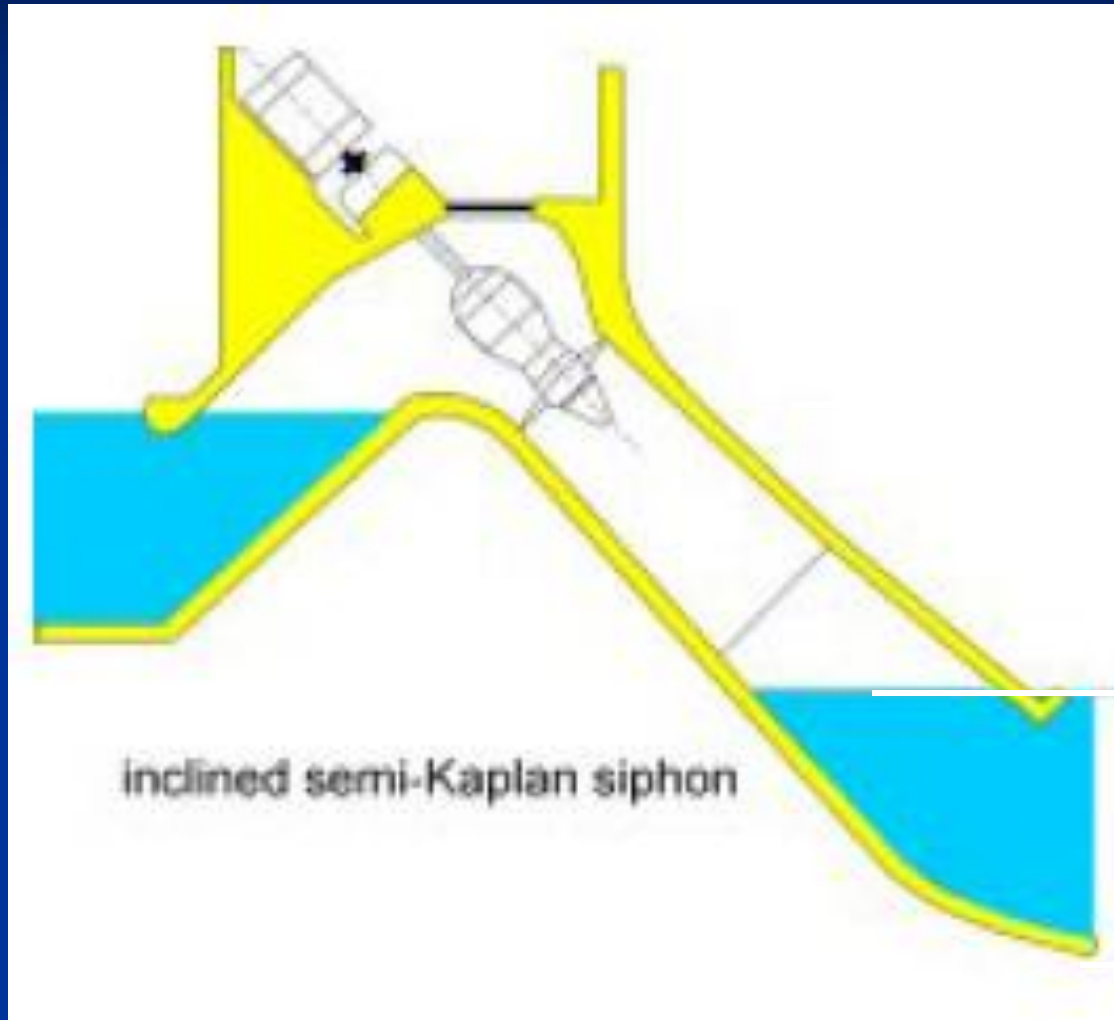
Determine if it is economically attractive to develop hydropower on the Fox river.



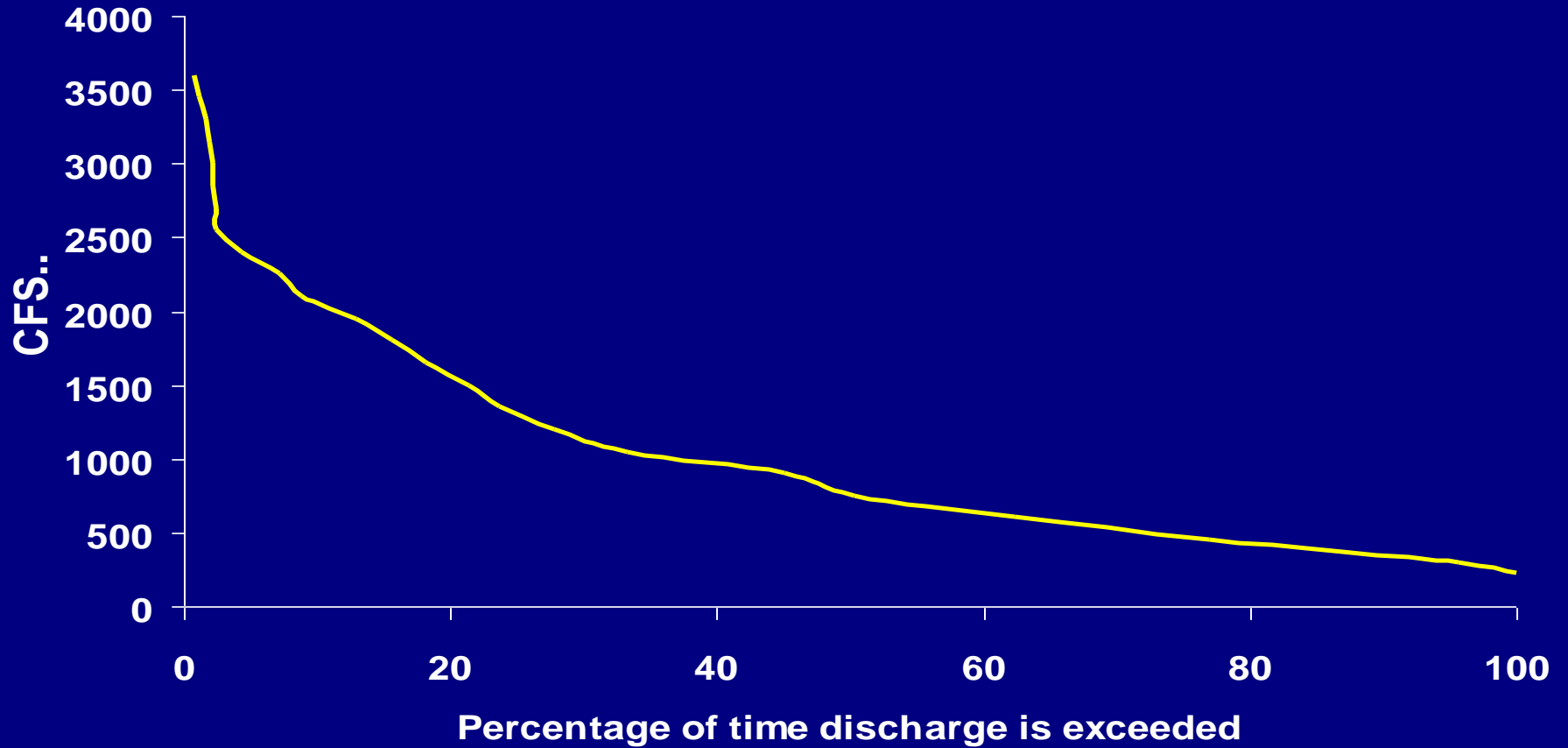
Strategy

- Filter out potential candidates, but how?
 - Eliminate dams recommended for removal
 - Examine head and flow data
 - Calculate potential output
 - Investigate possible turbines
 - Estimate total cost and benefit
 - Examine benefit/cost ratio

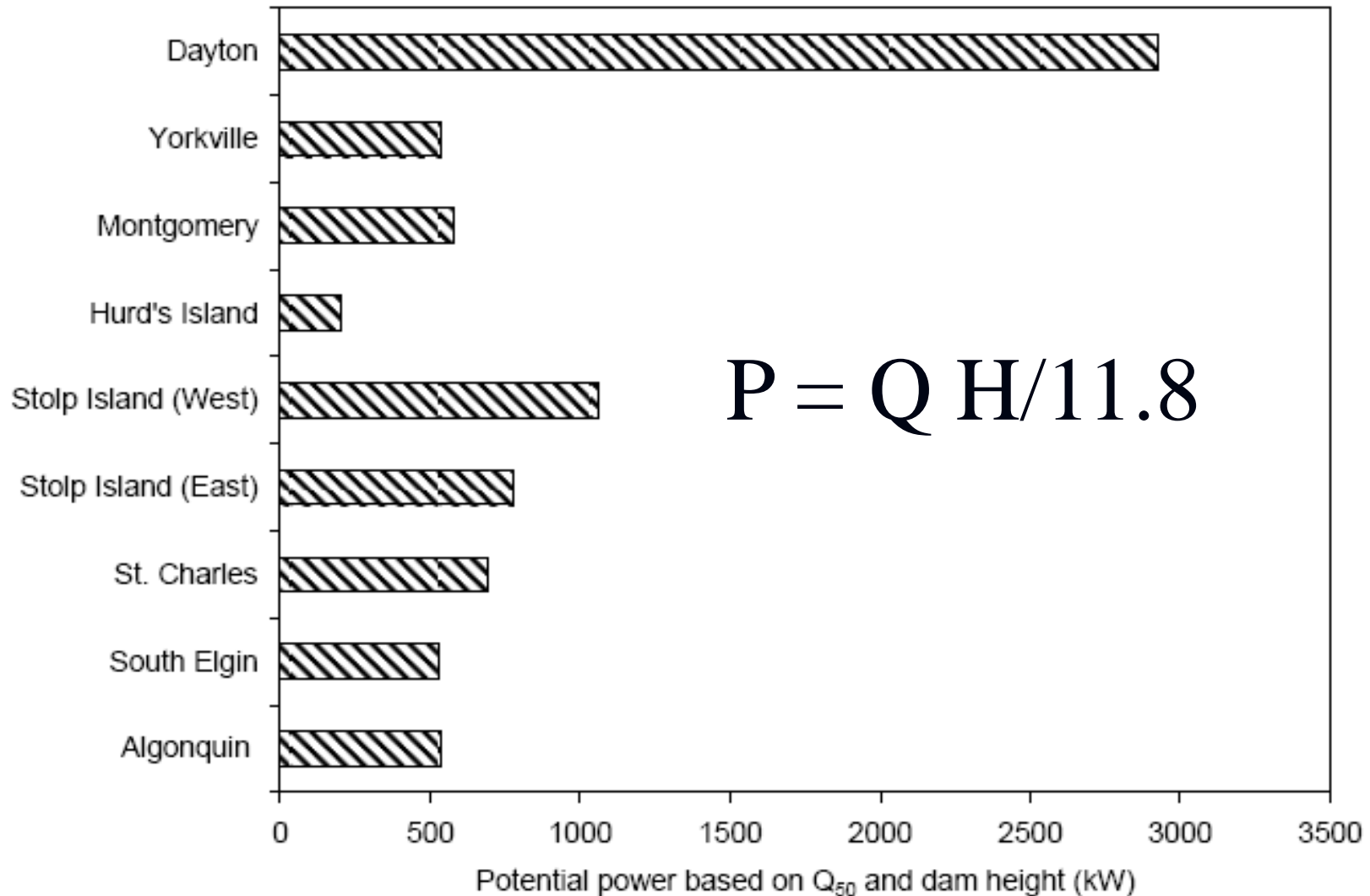
Head vs. Height



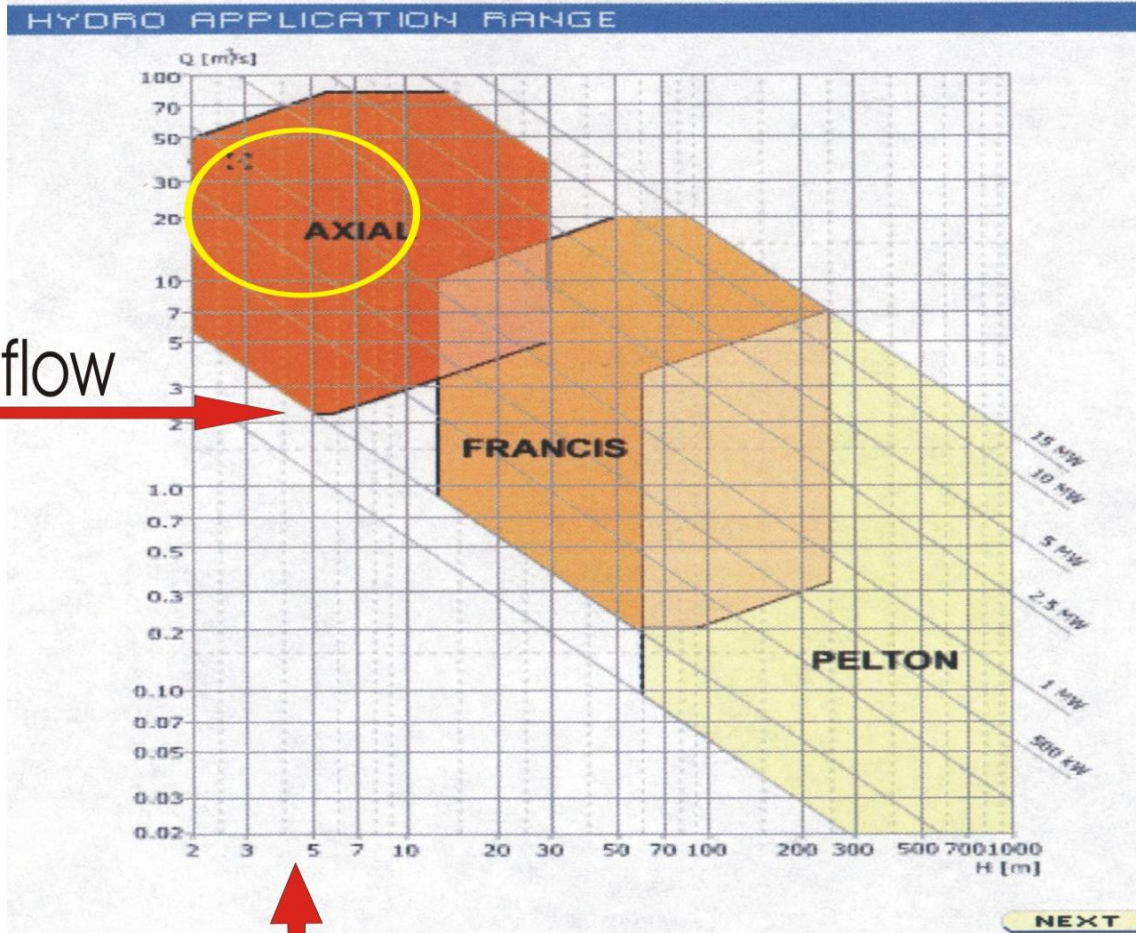
Flow Duration Curve



Potential Power Output



Which kind of turbine should be used?

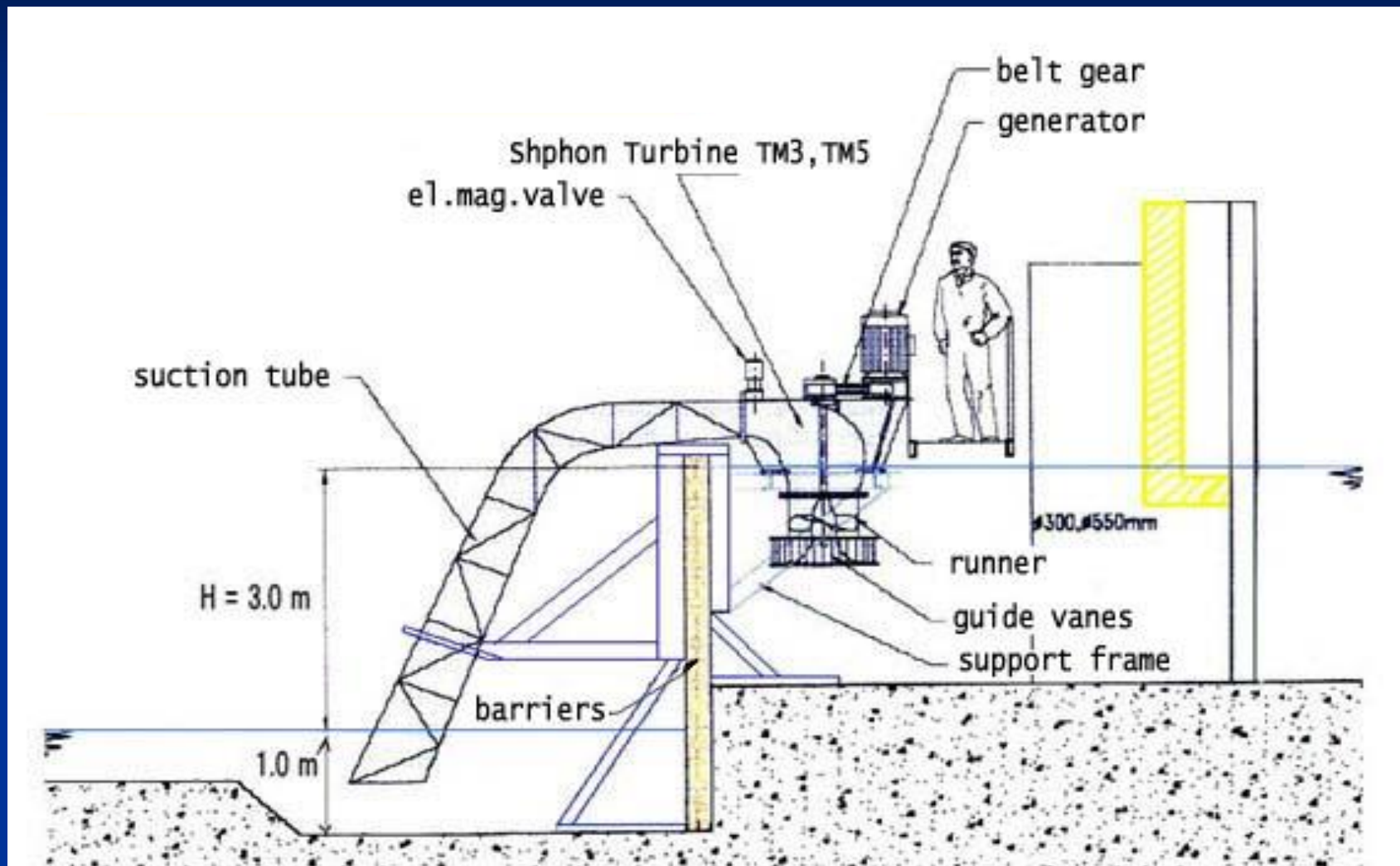


minimum flow



maximum head

Siphon Turbine



Cost estimate in Millions (USD)

Site Fox River	Elgin	Geneva	Stolp Isl.
Installed Capacity MW	0.405	0.99	1.06
Equipment	\$ 2.1	\$ 3.3	\$ 4.1
Civil Work	\$ 0.53	\$ 0.8	\$ 1.0
Total direct cost	\$ 2.6	\$ 4.1	\$ 5.0
Contingencies	\$ 0.4	\$ 0.7	\$ 0.8
Subtotal	\$ 3.2	\$ 5.1	\$ 6.1
Grant from IL	\$ 1	\$ 1	\$ 1
Total project cost	\$ 2.2	\$ 4.05	\$ 5.2
Cost per kW (actual USD)	\$ 4192	\$ 4090	\$ 4900



North American Hydro feasibility Study for Elgin.

480KW



City of Peru Hydroelectric plant

8MW



Kankakee Hydroelectric plant

1.2MW



Cost in M USD	5.2	14.7	5.5
Cost per KW *1000	11	1.8	4.6

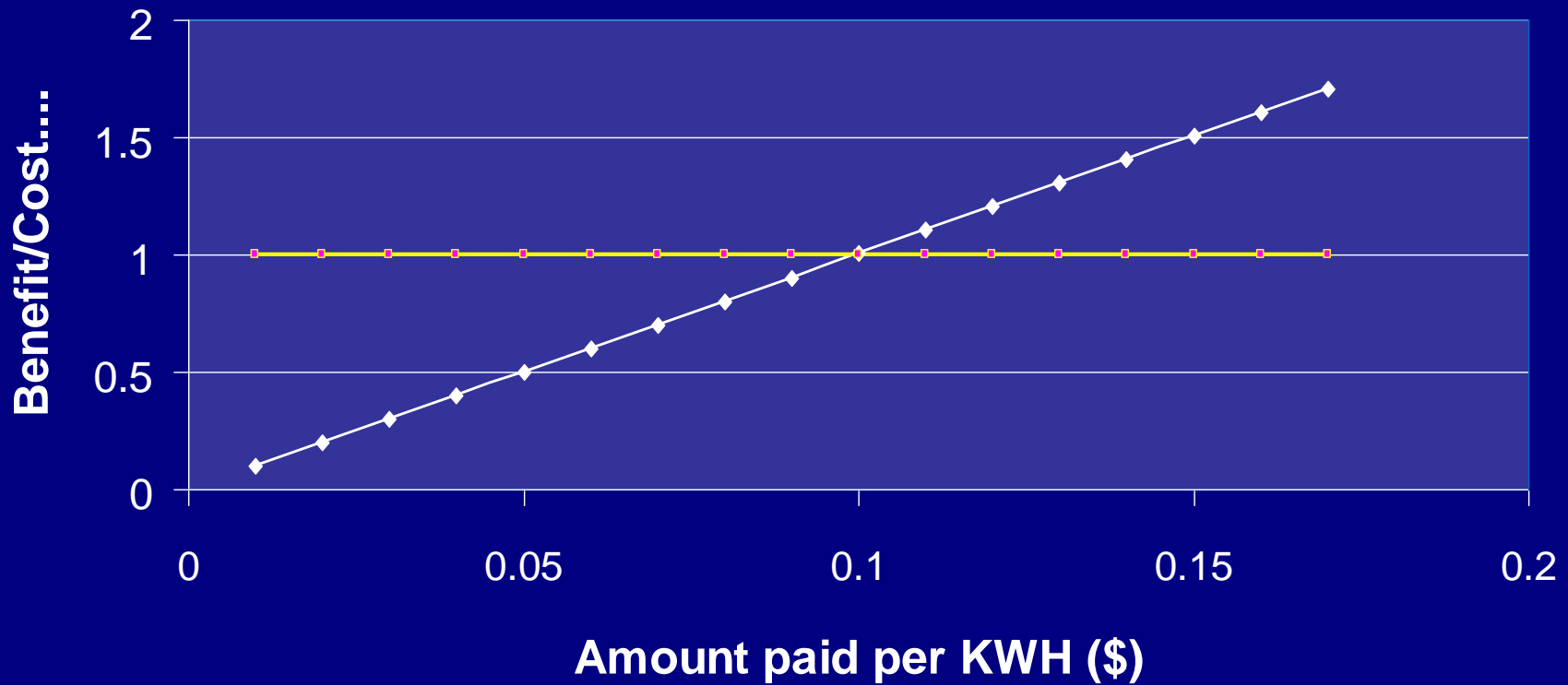
10 Year Analysis for Elgin



Interest rate=5.25%

Electricity sold for 8.3 cents/KWh

How can we profit then?



**Where do we
go from here?**

We Would Like to Thank

Dr. Alex Tseng

Prof. Paul Anderson

Prof. James Braband

Naila Madhi

Steve Pertzborn,
City of Elgin

Peter Bityou,
City of Elgin

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City of Kankakee Municipal Utility

Ken Schroth, Director of
Public Works, City of
Aurora

John Loete, Director of
Public Works, City of
Elgin