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Hydroelectric Power in the United States

- ✓ In 2015, renewable energy accounted for 13 percent of the total net electricity generated in the United States
- ✓ Hydropower accounted for 46 percent of that total
- ✓ The states with the largest hydroelectric generation are Washington, California, New York, Oregon and Alabama.

Hydro Power In the United States



Conowingo Hydroelectric Project (P-405)



Conowingo Hydroelectric Project (P-405)

For more than 85 years, the Conowingo Dam has been a source of clean, reliable energy for thousands of residents and businesses.

- ✓ Location: **Lower Susquehanna River, Darlington, MD**
- ✓ Began operation: **1928**
- ✓ Capacity: **572 megawatts**
- ✓ 2015 Generation: **1.5 million megawatt hours** (*enough to power more than 150,000 typical households for an entire year.*)
- ✓ Last Relicensing: **1980**
- ✓ Current license expired: **September 2014**
 - ✓ Operating under annual license
- ✓ New 46-year license application filed: **August 2012**
- ✓ Required approvals:
 - ✓ **Maryland Department of Environment** (401 Water Quality Certification)
 - ✓ **FERC** (license)



Muddy Run Pumped Storage Project (P-2355)



Muddy Run Pumped Storage Project (P-2355)

- ✓ Location: Lower Susquehanna River, Drumore and Martic Townships, Lancaster County, PA
- ✓ Began operation: 1967
- ✓ Capacity: 1072 megawatts
- ✓ Current License Issued: December 2015 (40 years)
- ✓ Current license expires: December 2055
- ✓ Required approvals:
 - ✓ Pennsylvania PaDEP (401 Water Quality Certification)
 - ✓ FERC (license)

Exelon Hydro Relicensing History

Conowingo

- 1926 First FERC license Issued (50 years)
- 1972 Exelon filed a proposed new license
- 1976 First License Expired.
- 1977 Conowingo operated under annual licenses
- 1980 Second FERC license was granted.
- 1989 FERC approved subsequent settlement agreement and incorporated terms into license
- 2014 Second FERC license expired
- 2016 Conowingo currently operating under annual licenses

Muddy Run

- 1964 First FERC License Issued (50 years)
- 2014 First License expired
- 2015 Second FERC License Issued (40 years)
- 2055 Second FERC License Expires

Relicensing Background

- ✓ Under Federal Power Act, FERC has exclusive authority to license non federal hydropower projects on navigable waterways or federal lands, or connected to the interstate grid
- ✓ FERC issues licenses for terms of 30, 40 or 50 years
- ✓ Most applicants use FERC's Integrated Licensing Process (ILP) which requires consultation with stakeholders in advance of license application
- ✓ FERC and regulatory agencies may impose license conditions requiring capital, O & M expenditures and generation restrictions for up to the term of the license
- ✓ Applicant's relicensing teams are typically comprised of members of environmental, station, communications, safety, legal, licensing consultants, hydrologists and finance.

Licensing Regulation

- ✓ The Federal Energy Regulatory Commission regulates approximately 1700 hydroelectric dams.
- ✓ Currently 55 are in relicensing process
- ✓ Three Types of Licensing Processes
 - Traditional (TLP)
 - Alternative (ALP)
 - Integrated (ILP)

FERC Licensing Framework

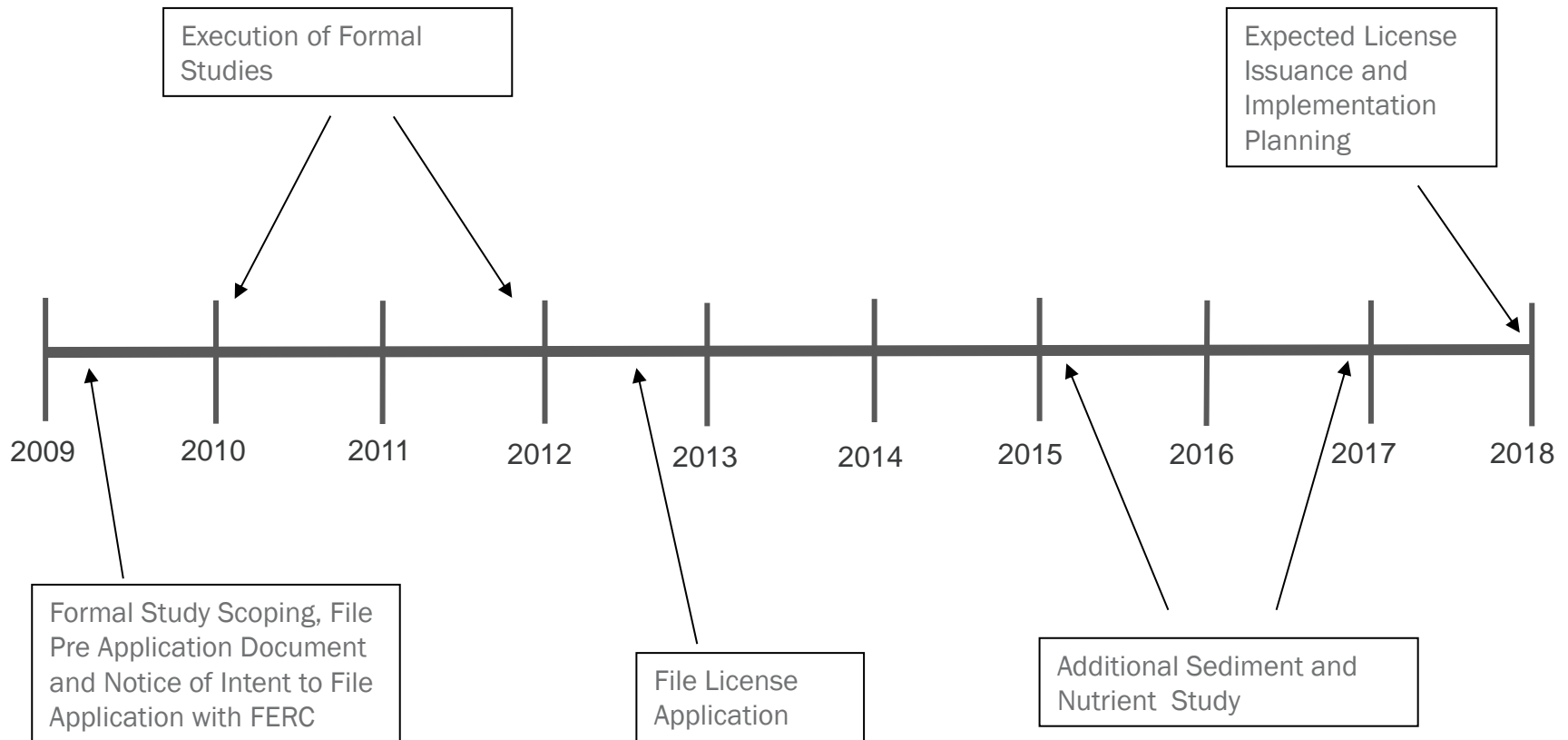
Integrated Licensing Process (ILP) –

- ✓ FERC issued a Final Rule in 2003 to revise the Federal Power Act to create a new licensing process called the Integrated Licensing Process.
- ✓ Under ILP , Applicant's pre-filing consultation and FERC's scoping pursuant to National Environmental Policy Act is conducted concurrently
- ✓ Benefits of ILP
 - ✓ Greater coordination among FERC and federal and state agencies
 - ✓ Assistance by FERC during development of license application
 - ✓ FERC scoping process
 - ✓ Plan and schedule
 - ✓ Commission approved study plan

Licensing Process

- ✓ Exelon is currently pursuing the relicensing of Conowingo using the FERC integrated licensing process (ILP)
 - ✓ 7 to 9 year process that involves consultation with regulatory agencies and stakeholders
 - ✓ Sets milestones to be met by the licensee, FERC and stakeholders
 - ✓ Regulatory process continues to move forward as Exelon works with state and federal agencies to address natural resource issues, such as fish passage, water quality, shoreline management and recreational conditions.

Licensing Timeline



Select Hydro Relicensing Studies

Since 2010, Exelon Generation has conducted more than 50 studies that were selected and designed in consultation with licensing stakeholders at a cost of approximately \$7.8 million.

C3.5 Attraction Flows

C3.8 Downstream Flow Ramping

C3.11 Hydrologic Studies

C3.15 Sediment Transport Studies

C3.16 Instream Flow Habitat

MR3.2 Hydrologic Study of Muddy Run

MR3.3 Entrainment Study

MR3.5 Downstream Fish Passage

Maryland Darter



Sediment Transport

- ✓ Sediment deposition into the Susquehanna River is a multi-stakeholder, multi-state issue resulting from upstream run-off
- ✓ Maryland Department of the Environment (MDE) has indicated water quality aspects of sediment transport will be addressed by MDE in its issuance of the Clean Water Act 401 Water Quality Certification, which is required before FERC can issue the new license
- ✓ The draft Lower Susquehanna River Watershed Assessment (LSRWA) was released by U.S. Army Corps of Engineers to the public in November 2014

Major findings of the report include:

- The majority of the sediment that enters the bay during storm events originates from the watershed, or upstream sources, rather than scour from Conowingo Pond.
- The primary impact to aquatic life and the bay's health comes from nutrients and sediment from the Susquehanna River and Chesapeake Bay watershed.
- Removing a significant amount of sediment via dredging has little long-term impact to the health of the bay.
- Reducing upstream nutrient and sediment loads through implementation of the Total Maximum Discharge Load (TMDL) and associated jurisdiction Watershed Implementation Plans (WIPs) offers a long-term solution to improving the health of the Chesapeake Bay.

Partial List of Stakeholders and Areas of Concern

FERC	Licensee has taken proper measures to protect, mitigate and enhance (PME) environment. Security issues at Conowingo.
US Fish & Wildlife (USFW)	American Shad and American Eel Fish Passage, Impact to wildlife and fish from dam operations and Rare, Threatened and Endangered Species
PA Department Environmental Protection	Water quality and fish passage
PA Fish & Boat Commission	Fish passage, recreational opportunities, water quality
MDE/MD Department of Natural Resources	Water quality and minimum flows necessary for recreation and wildlife, sediment build up behind dam
Susquehanna River Basin Commission	Minimum flows, Basin Wide water resource issues.
National Oceanic and Atmospheric Agency/National Marines Fisheries Service	Rare, Threatened and Endangered Species (Short Nose Sturgeon)

Mandatory Conditioning Authority

Certain federal and state agencies have statutory authority to impose mandatory license conditions that cannot be rejected or modified by FERC.

- These agencies are:
 - ✓ U.S. Department of Interior/ U.S. Fish & Wildlife Service (USFW)
 - ✓ U.S. Department of Commerce/ National Oceanic and Atmospheric Agency (NOAA)/National Marine Fisheries Service (NMFS)
 - ✓ Maryland Department of Environment (MDE) / Maryland Department of Natural Resources (MDNR)
 - ✓ Pennsylvania Department of Environmental Protection (PaDEP)
- Dispute resolution processes
 - ✓ Federal agencies use a trial-type hearing where Exelon can challenge the mandatory conditions imposed by federal agencies (USFWS and NMFS)
 - ✓ Disputes with PaDEP or MDE/MDNR are resolved through an appeal of the 401-water quality certification.

Federal Legislation Important to Relicensing

- ✓ National Environmental Policy Act of 1969 (NEPA) – requires all federal agencies involved in permitting to evaluate environmental impacts and significance of impacts
- ✓ Fish and Wildlife Coordination Act – FERC is required to consult with USFWS and state fish agencies regarding conservation of resources
- ✓ National Historic Preservation Act - FERC is required to take into account the effect of the Projects on any building, structure or object that is in or eligible to be included in the National Register of Historic Places
- ✓ Clean Water Act – Under section 401 a water quality certificate is required from MD and PA
- ✓ American with Disabilities Act –Public accommodations must be accessible to persons with disabilities (important with respect to planning new recreational facilities)
- ✓ Endangered Species Act – Required to protect endangered species

Threatened and Endangered Species – American Shad



Bald Eagle



Recreation

- ✓ FERC Standard Article 18 states: Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting....
- ✓ As part of relicensing FERC, Exelon will be required to inventory our recreational facilities for use and determine whether they have reached capacity.
- ✓ FERC requires Exelon to provide reasonable expenditures to develop suitable recreation facilities
- ✓ If facilities are not adequate, FERC will require construction of facilities to be expanded or new facilities constructed.
- ✓ Recreation Areas
 - Muddy Run Park
 - Fisherman's Wharf
 - Octorora Trail
 - Conowingo Visitor Center and Pool

Conowingo Fishermans's Wharf



Questions

