



Reimagining America's **Clean Energy**

2018 ANNUAL REPORT

Electricity generation

In 2018, hydro made up about **7 percent of total electricity** generation and **39 percent of renewable electricity** generation.

142 MW of generation

In 2018 hydropower **added 142 MW of generation**, while the net increase in installed capacity between 2006 and 2016 was 2,030 MW.

Small hydro

Since passage of 2013 HERA, **105 conduit projects totaling 33 MW** have been deemed eligible for construction by FERC.

Hydropower Trends In America

Rehabs & Upgrades

U.S. hydropower **R&U projects worth \$8.9 billion** have started between 2007 and 2017. Federal hydropower represents 49% of U.S. hydropower capacity, but R&U investment in the federal fleet (excluding PSH projects) only represents 39% of total R&U investment.

NPDs under development

More than half of the **129 NPDs under development are located at dams** owned by the U.S. Army Corps of Engineers (USACE). Nine projects propose developing new stream-reaches and eight of them are in the Northwest region.

223 turbine units

At least **223 turbine units distributed across 93 hydropower and PSH plants were installed** in the United States between 2007 and 2017. Their total capacity is almost 9 GW. Fifty-seven (26%) of the units were installed in new plants and the rest were either unit additions, replacements, or upgrades at existing hydropower plants.

Letter from President and Executive Director

Near the end of 2018, the President signed into law, the America's Water Infrastructure Act (AWIA). For the hydropower industry and NHA, his signature was a sigh of relief after years of hard work to modernize the licensing process. As an industry, we secured the inclusion of five comprehensive hydropower licensing reform provisions.

Passage of this critical bill, however, is only one piece of the puzzle. Looking forward to 2019, NHA's regulatory work will be key to ensuring the implementation of the AWIA provisions in the FERC rulemaking process. The good news is we are well-positioned to continue to make legislative and regulatory headway.

While our work on Capitol Hill is important, our efforts to enhance our member programs remain key priority at NHA. Last year, we held two Waterpower Innovation Forums in New York and California. The goal was to bring all sectors of the waterpower industry together to brainstorm and discuss the key technical issues that are preventing the industry from moving forward. The information collected at these forums will be used for the second phase of the Waterpower Innovation Council's work.

Additionally, our Operational Excellence program (OpEx), a voluntary event reporting system, which provides the industry a forum to learn from one another, held several human performance workshops last year. At each workshop, attendees received human performance training and then applied that training to actual case studies from the OpEx database.

During 2018, NHA charted a path to grow and expand in new ways. For marine energy, NHA was selected to host the International Conference for Ocean Energy (ICOE) 2020, to be held in conjunction with Waterpower Week in Washington. Marine energy is America's next-gen renewable, and we are thrilled to help lead the way.

Indeed, 2018 was a banner year for NHA, but we aren't resting on our laurels. For 2019, our goal is to take a leadership role in shaping energy market policy, which for too long has put hydropower at a disadvantage. We've also set our sights on holding a Small Hydro Summit to discuss the opportunities and challenges in the small hydro sector.

As an industry we are united. We encourage you to continue supporting NHA's work and urge you to take an active role in helping us move the industry's agenda forward.

Sincerely,



Linda Church Ciocci, NHA CEO & President



Alvin Thoma, NHA Chair



Linda Church Ciocci
NHA CEO & President



Alvin Thoma
NHA Chair



2019 NHA Leadership

Executive Committee

Chair: Alvin Thoma, Pacific Gas and Electric Co.

Vice Chair: Mike Haynes, Seattle City Light

Treasurer: Jay Anders, Black & Veatch

Secretary: John Suloway, Gomez and Sullivan

Past President: Herbie Johnson,
Southern Company

NHA CEO & President: Linda Church Ciocci

General Counsel: James Hancock,
Balch & Bingham LLP

Board of Directors

Jay Anders, Black & Veatch (NHA Treasurer)

Wendy Bley, TRC Companies

Steve Boyd, Turlock Irrigation District

Jane Cirrincione, Northern California Power Agency

David Culligan, HDR, Inc.

Bob Gallo, Voith Hydro

Marc Gerken, American Municipal Power

Suzanne Grassell, Chelan County PUD

Kimberly Harriman, New York Power Authority

Mike Haynes, Seattle City Light (NHA Vice Chair)

Randy Herrin, Duke Energy

Herbie Johnson, Southern Company
(NHA Past Chair)

Reenst Lesemann, Columbia Power Technologies

Michael Manwaring, McMillen Jacobs Associates

Frankie McDermott, Sacramento Municipal
Utility District

Andrew Munro, Grant County PUD

Debbie Mursch, GE Renewables

Christopher Rousseau, Minnesota Power

Charles Sensiba, Troutman Sanders Strategies

John Suloway, Gomez and Sullivan (NHA Secretary)

Alvin Thoma, Pacific Gas & Electric (NHA Chair)

Travis Smith, SNC-Lavalin (Advisor)

Doug Spaulding, Nelson Energy (Advisor)



Jeff Leahey speaks at National Clean Energy Week.



Energy Under Secretary Mark Menzes speaks at 2018 Waterpower Week.

TOP OF THE HILL: **Legislative & Regulatory Efforts**

Legislative Efforts

In 2018, NHA made significant strides in modernizing the licensing process. Last year, President Trump signed the America's Water Infrastructure Act (AWIA) into law, which contained a number of key provisions for the hydropower industry. Now that the bill is law, FERC is working to establish an expedited 2-year licensing processes for non-powered dams and closed-loop pumped storage projects. Hydropower has immense growth potential, and we believe that with a new process in place with increased certainty, we can spur development. And for small hydro, the bill enables conduit projects up to 40 MW to qualify for the expedited licensing process approved by Congress in 2013. Previously, projects were capped at 5 MW. It also shortens the timeframe by 2 weeks.

Equally importantly, is protecting our nation's existing fleet. To that end, the bill directs FERC to consider, in determining the term of a new license, project-related investments made over the term of the existing license. It requires FERC to give the same weight to these investments, which include re-development activities, new construction, new capacity, efficiency improvements, modernization efforts, rehabilitation, safety improvements, and recreation and environmental measures. While there is still work to be done to bring greater timeliness and certainty to the licensing process, we are pleased that Congress took critical steps to fix an outdated and outmoded process.

NHA also successfully secured funding for the Department of Energy's Water Power Technologies Office (WPTO) in the Energy and Water Appropriations measure. Congress

approved \$105 million for the WPTO, matching last year's all-time high. Once again, \$70 million was appropriated for the marine energy program and \$35 million for the hydropower and pumped storage program. This is a tremendous result for NHA and the industry, as significant cutbacks were proposed to the WPTO for the 2019 fiscal year.

NHA also continued fighting to end the tax policy disparity that puts hydropower development at a significant competitive disadvantage, particularly in the eyes of investors who are seeking clarity and certainty. NHA led an effort with a broad coalition of industries to secure an extension of the hydropower tax credits. The coalition push included an advertising campaign aimed at Congressional influencers. While tax extender efforts are still ongoing, NHA continues working to level the playing field by passing an immediate long-term extension of the hydropower and marine energy incentives.

Regulatory Efforts

Last year, NHA submitted regulatory comments on a number of issues facing the industry. On behalf of the industry, NHA files comments on EPA's Region 10 draft National Pollutant Discharge Elimination System General Permit (draft NPDES GP) for discharges from hydroelectric facilities located in the state of Idaho (and Region 1 located in Massachusetts and New Hampshire).

Additionally, NHA along with the Northwest Hydroelectric Association (NWhA) submitted comprehensive comments to both the Fish and Wildlife Service and the National Marine

Fisheries Service on their proposed revisions to the implementation of the Endangered Species Act (ESA). The comments highlight the importance the hydropower industry places on protecting threatened and endangered species and their habitats, while noting that the industry commits tremendous resources to those goals each year through enhancement, restoration, and fish passage measures. The comments then state that the proposed rules would not reduce the substantive protections for threatened and endangered species, but should result in meaningful benefits by improving the efficiency and effectiveness of the ESA's implementation.

NHA also filed substantive comments with the White House Council on Environmental Quality (CEQ) on its advanced notice of proposed rulemaking (ANOPR) seeking comments to update its implementing regulations for the National Environmental Policy Act (NEPA). In the comments NHA fully supported a robust and comprehensive environmental review process. However, NHA also stated that significant changes are needed to modernize CEQ's NEPA regulations in a manner that will inform the evaluation of environmental impacts, environmental effects, and alternatives, but do so in a manner that is more cost-effective, reduces redundancy, and is time-sensitive.

Additionally, near the end of 2018, in a unanimous vote, the Federal Energy Regulatory Commission issued a Final Rule to amend its regulations to eliminate the Licensed Hydropower Development Recreation Report, designated as FERC Form No. 80.

NHA 2018 Accomplishments

Hydropower Legislation and Specific Provisions Enacted into Law

In 2018, NHA helped to secure enactment of 16 bills or hydropower provisions. These included NHA priority policy items (e.g. licensing, tax, appropriations) that affect the hydropower industry at large, as well as various project-specific bills that benefited individual industry members.

America's Water Infrastructure Act of 2018 - S. 3021

- Non-Powered Dams: Requires FERC to establish an expedited process for issuing licenses for hydropower facilities at existing, non-powered dams. Also requires a new list of existing non-powered federal dams that have greatest potential for non-federal hydropower development.
- Closed-Loop Pumped Storage: Requires FERC to establish an expedited process for issuing licenses for closed-loop pumped storage projects. Also requires a workshop to explore potential opportunities for development of closed-loop pumped storage projects at abandoned mines.
- Conduit Hydropower: Authorizes conduit projects up to 40 MW to qualify for the expedited licensing process enacted in 2013. Reduces the length of the expedited timeframe by 2 weeks.
- Early Action Credit: Requires FERC to consider, in determining new license terms, project-related investments made during the existing license, including efficiency improvements, modernization efforts, rehabilitations, safety improvements, environmental measures and more.
- Start Construction Deadline Extensions: Provides FERC the authority to extend the deadline for a newly licensed project to begin construction, where previously, enactment of individual project legislation was required.

Energy and Water, Legislative Branch, and Military Construction and Veterans Affairs Appropriations Act, 2019 - H.R. 5895

Approved \$105 million for the Department of Energy Water Power Technologies Office (WPTO), continuing the record funding level from FY 2018. \$70 million approved

for marine energy and \$35 million for hydropower and pumped storage, including \$6.6 million for the Energy Policy Act of 2005 Section 242 hydropower incentive program for non-powered dams and conduit project deployment.

Bipartisan Budget Act of 2018 - H.R.1892

Included a 1-year extension of the hydropower and marine energy production/investment tax credits (PTC/ITC) retroactive through 2017.

Individual Project Bills

- H.R. 219, Swan Lake Hydroelectric Boundary Correction Act
- H.R. 220, a bill to authorize the expansion of an existing hydroelectric project at Terror Lake
- H.R. 446, to extend the deadline for commencement of construction of Gathright project
- H.R. 447, to extend the deadline for commencement of construction of Flanagan project
- H.R. 951, to extend the deadline for commencement of construction of W. Kerr Scott project
- H.R. 2122, to reinstate and extend the deadline for commencement of construction of Jennings Randolph project
- H.R. 2457, extends the license of construction for the J. Bennett Johnston Waterway project
- S. 215, a bill to authorize the Federal Energy Regulatory Commission to issue an order continuing a stay of a hydroelectric license for the Mahoney Lake hydroelectric project
- S. 490, a bill to reinstate and extend the deadline for commencement of construction of a hydroelectric project involving the Gibson Dam

Regulatory Policies Adopted

The following are new regulatory policies adopted by various federal agencies impacting hydropower asset owners and/or developers on market, permitting, mitigation, dam safety and administrative cost issues.

FERC Issues Final Rule on Electric Storage Participation in Regional Markets

FERC Order 841 removed barriers to the participation of electric storage resources in the capacity, energy and ancillary services markets operated by Regional Transmission Organizations and Independent System Operators.

Final Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects

The Final Engineering Circular adopts numerous changes to the 33 U.S.C. Section 408 process and creates new options and efficiencies that may serve to streamline 408 review for projects.

Fish and Wildlife Service Rescinds 2016 Mitigation Policy

The 2016 policy had adopted new mitigation strategies to establish a "net benefit" or "no net loss" goal as directed by a presidential memorandum. NHA expressed concern that doing so would be inconsistent with the balancing done under the Federal Power Act and would be unworkable.

FERC Issues Final Guidance on Water Conveyances

NHA, through the Hydraulic Power Committee, filed comments on FERC's proposed update to Chapter 12 -Water Conveyances to be included in the Engineering Guidelines for the Evaluation of Hydropower Projects.

FERC Issues Final Rule on Alaskan Annual Charges Calculations

The Commission revised the per-acre land value component of its methodology for calculating annual charges for hydropower projects located in Alaska.

NHA 2018 Accomplishments

NHA Work on Proposed Regulatory Policies and Legal Cases

In addition to policies that were finalized in 2018, several other new proposals were issued throughout the year in which NHA was actively engaged on behalf of the industry, but that have yet to be finalized. Several of these proposals have the potential to provide significant regulatory relief to the industry. Others could impose new requirements that raised concerns for the Association. NHA also responded to legal cases that posed significant questions and raised issues critical for the hydropower industry.

F&WS and NMFS NOPR on ESA Improvements

NHA filed comments on the Fish and Wildlife Service's and National Marine Fisheries Service's proposed revisions to the Endangered Species Act Section 4 (listing and critical habitat) rule, Section 4(d) (protective regulations) rule and Section 7 (interagency cooperation) rule. In particular, NHA responded to the Services' proposal to create a standalone definition for "environmental baseline," supporting a definition that clearly articulates existing structures and their ongoing impacts are part of the baseline.

EPA Region 1 & 10 Cooling Water Intake Structures Proposal

EPA Region 10 (Alaska, Washington, Oregon and Idaho) and EPA Region 1 (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut) released a draft National Pollutant Discharge Elimination System General Permit for discharges from hydropower facilities. In particular, the draft general permits sought to impose cooling water intake structure requirements based on Section 316(b) of the Clean Water Act in the states of ID, MA and NH. NHA's comments opposed the applicability of Section 316b to hydropower facilities.

FERC Grid Resiliency Proceeding

FERC initiated the proceeding to specifically evaluate the resilience of the bulk power system in the regions operated by regional transmission organizations (RTO) and independent system operators (ISO). The Commission directed each RTO and ISO to submit information to the Commission on resilience issues and concerns. NHA submitted comments promoting the need to value and compensate the grid reliability and resiliency attributes from the hydro and PSH fleet—existing and new.

CEQ ANOPR on NEPA Reform

The White House Council on Environmental Quality (CEQ) issued an advanced notice of proposed rulemaking seeking comments on updating its implementing regulations for the National Environmental Policy Act (NEPA). NHA filed comments that fully supported a robust and comprehensive environmental review process, while stating that significant changes are needed to modernize CEQ's NEPA regulations in a manner that informs the evaluation of environmental effects, but do so in a manner that is more cost-effective, and reduces redundancy and delay.

DOE RFI on Hydropower and Pumped Storage

The Department of Energy's Water Power Technologies Office (WPTO) issued a request for information seeking input on new research to maximize the value of hydropower's contribution to grid resiliency and reliability today and into the future. NHA provided comments highlighting these benefits and the need to appropriately recognize and compensate hydropower and pumped storage projects for them.

FERC NOPR to Eliminate Form 80

FERC issued a Notice of Proposed Rulemaking that would amend its regulations to eliminate the Licensed Hydropower Development Recreation



Linda Church Ciocci, NHA CEO & President, speaking at 2018 Waterpower Week.

Report, known as Form 80. NHA filed comments supporting the Commission proposal to eliminate the form.

Forest Service and Alaska Propose to Work on Roadless Rule

The State of Alaska and the Forest Service signed a memorandum of understanding to develop an Alaska state-specific roadless rule. NHA has raised this issue in meetings with the Forest Service and federal officials.

Supreme Court Issues Decision in EPA Water Transfer Rule Case

The Supreme Court decided not to hear an appeal of a U.S. Second Circuit Court of Appeals case upholding the EPA Water Transfer Rule. NHA urged the EPA, when the agency lost the case at the district court level, to appeal that decision. The Association also participated in an amicus brief in the Second Circuit in support of the EPA and the rule.

Ninth Circuit Court of Appeals Case on "Environmental Baseline"

NHA supported an amicus brief in the Friends of the River case, which involves several issues that could impact the hydropower industry regarding the Endangered Species Act (ESA), the impact of dams on listed species, and the standard for environmental baseline in ESA review.



Pursuing Operational Excellence

NHA's Operational Excellence (OpEx) program is a member-only voluntary event reporting system that receives, distributes, archives, and catalogs hydro operating experiences and resulting best practices and lessons learned. OpEx scope and focus is on events related to safety (dam, employee, and public), operations, maintenance and environmental performance, and is intended to be a tool to help avoid events experienced by others, train a workforce in development, and assist in managing aging assets.

OpEx also held workshops entitled Human Performance Fundamentals, where attendees received human performance training and then applied that training to actual case studies from the OpEx database.

Is your company signed up for OpEx?
Learn how to participate at www.hydroexcellence.org.

Connecting the Hydropower Industry

NHA prides itself on being of service to the industry and our membership. And one of the most important roles we play is bringing hydropower professionals from all segments of the industry together. To that end, we worked hard to provide members with a multitude of opportunities to learn, network and share best practices.

The 2018 Waterpower Week in Washington brought together hundreds of members of the hydropower and marine energy industry. The Conference was accompanied by two new co-located events: International Marine Renewable Energy Conference (IMREC) and the 3rd Annual Marine Energy Technology Symposium (METS).

NHA's regional meetings program continues to be an essential part of the hydropower industry's calendar every year. In 2018, we held meetings in California, Alaska, Iowa, Georgia, and Maine, with panels on issues ranging from fish passage to dam safety. And we are pleased to announce the California Meeting was the most attended regional meeting in history, with 173 attendees.

Are you interested in attending a regional event?
Go to Hydro.org for more information.

In 2018, OpEx experienced significant growth, with over **150 Event Reports** added to the system.

Maintenance
98

Safety
28

Operations
17

Environmental
7



Kirby Gilbert speaks at NHA's SW Regional Meeting.



NHA to Host 2020 International Conference on Ocean Energy (ICOE)

NHA was selected to host the International Conference on Ocean Energy (ICOE) 2020 in Washington, D.C. Every two years, ICOE gathers over 500 international stakeholders, experts and exhibitors from the marine energy sectors (tidal, wave, ocean currents, ocean thermal gradients) to discuss device innovation, new market developments and regulatory frameworks to spur commercialization. In addition to unparalleled opportunities to network and learn from industry leaders from around the world, the event provides a variety of forums for attendees to share advancements in research and technology breakthroughs.

"We are thrilled to be hosting ICOE 2020 in Washington, D.C., as it is an opportunity to shine a spotlight on the world's next-gen renewable," said Linda Church Ciocci, NHA President and CEO.

"Throughout the world, marine energy, in all its forms, is demonstrating its ability to provide clean, carbon-free energy. Ocean energy is no longer an abstract concept. With each passing day it inches closer to commercialization. Without question, Washington will serve as the ideal backdrop for this burgeoning industry to showcase its research and technological advancements."

This event is supported by the International Energy Agency (IEA) through Ocean Energy Systems (OES). OES is an intergovernmental group that works on international collaboration for ocean energy in order to accelerate the development of the sector and reduce the costs of these energies. NHA's Marine Energy Council is the leading trade organization of the U.S. marine energy industry, providing a united voice for the full spectrum of marine energy technologies.

By the Number: Hydropower in 2018

NHA Held Six Regional Meetings

**NHA Southwest
Regional Meeting**
Austin, TX



**NHA Northeast
Regional Meeting**
Albany, NY



**NHA Alaska
Regional Meeting**
Ketchikan, AK



**NHA Midwest
and MHUG
Regional Meeting**
Ludington, MI



**NHA California
Regional Meeting**
Los Angeles, CA



**HPC Fall
Retreat & NWA
Technical Meeting**
Walla Walla, WA

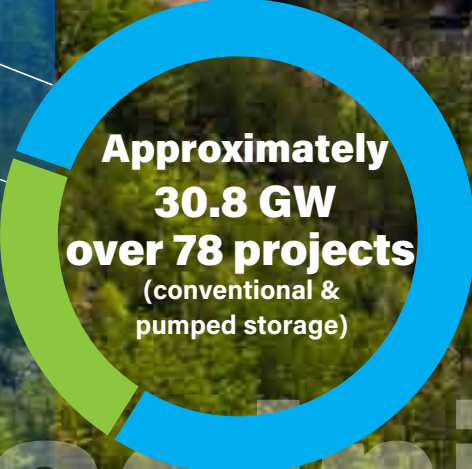


In the FERC Hydropower Pipeline

**Conventional Hydro: approximately
61 projects totaling 9.6 GW**

**Pumped Storage: approximately
17 projects totaling 21.2 GW**

*FERC pipeline includes
Active Preliminary Permits,
Pending Preliminary Permits and
Pending Licenses*

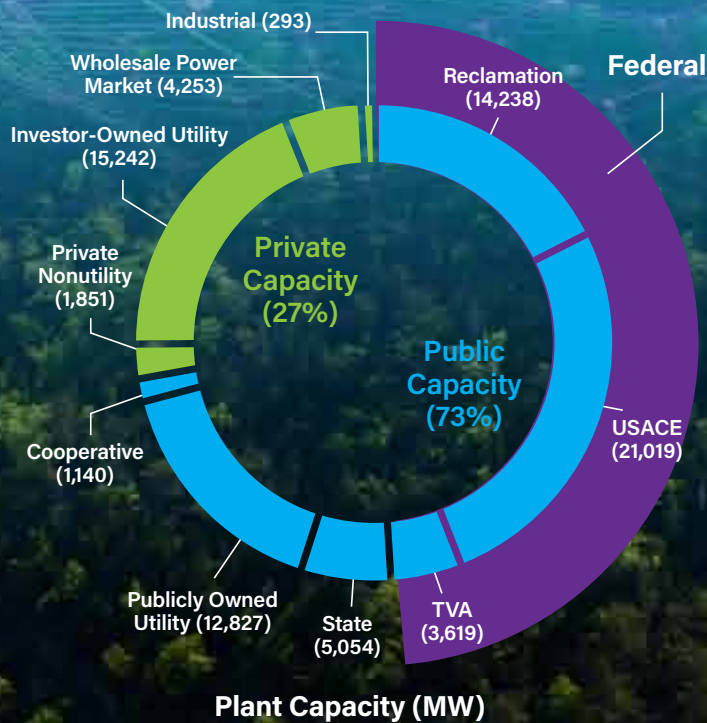


**Approximately
30.8 GW
over 78 projects**
(conventional &
pumped storage)

Reimagining America

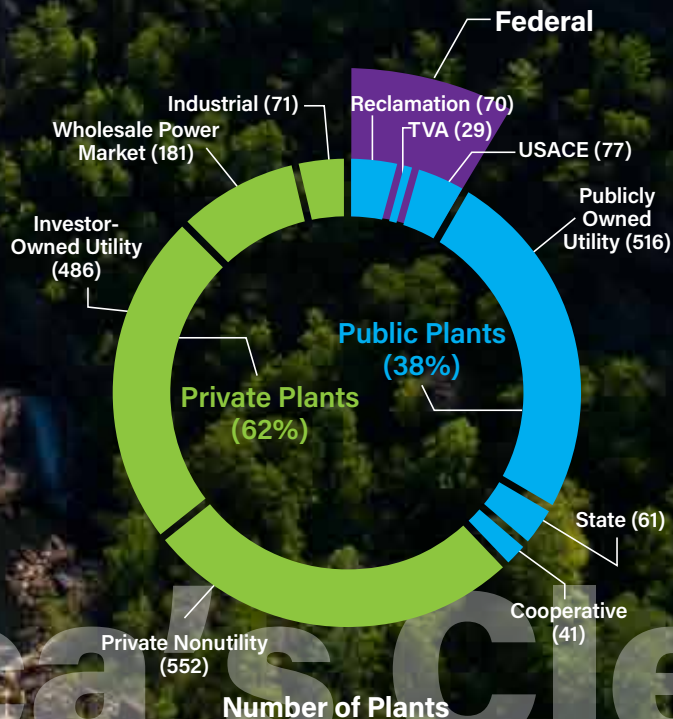
U.S. Hydropower Fleet Ownership Mix

- **176 plants** owned by federal agencies account for **49% of the capacity** but only **8% of the plants**.
- Publicly owned utilities, state agencies, and cooperatives own an additional **24% of total capacity**.
- The remaining quarter of installed capacity belongs to private owners and corresponds to **62% of hydropower plants**.



Econ Trends

- Although Francis turbines are the most common type in the existing U.S. feet, **54% of the turbines** installed at new plants during the last decade were **Kaplan**.



Section 242

- Department of Energy has paid **\$14.1 million in incentives** to developers of Non Powered Dams and conduit projects under Section 242 of the Energy Policy Act of 2005 between 2014 and 2017. This funding has gone to **63 unique projects** and a total of **1.4 TWh** of generation.

2018 New Members

Ayres Associates

Eaton

Harika Consulting

Hobas Pipe USA

Hydro Point

ITC Holdings

LEF Engineering, PLLC

Lemke Industrial Machine LLC

Meguire Whitney

Nidec - Kato Engineering - Leroy Sommer

NuStream (Hydrodynamic Energy)

Oglethorpe Power Corporation

Oregon Applied Research LLC

Sherwin Williams

Stillwater Sciences

Toshiba

Wisconsin Valley Improvement Company



2019 Awards

Outstanding Stewards of America's Waters

Recreational, Environmental, & Historical Enhancement

Seattle City Light: Mill Pond Dam Removal and Sullivan Creek Habitat Restoration

Brookfield Renewable: Eel Weir and Heuvelton Nature-Like Fishways

Exelon: Muddy Run Observatory

Public Education

Hydropower Foundation: Hydro Think Tank

Bonneville Power Administration: Hydropower Flows Here

Foundation for Water and Energy Education: Hydro Appreciation Day

Operational Excellence

Snohomish County PUD: Water Temperature Conditioning



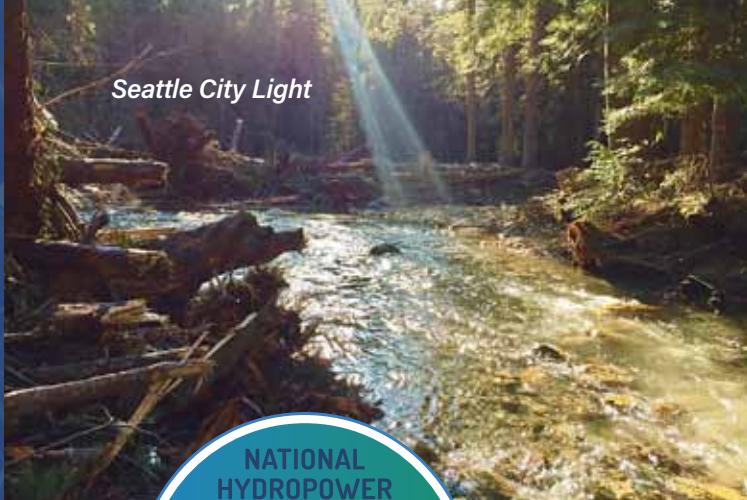
Mike Murphy
2018 Dr. Kenneth Henwood Award winner



Snohomish County PUD



Brookfield Renewable



Seattle City Light



Bonneville Power Administration



NATIONAL HYDROPOWER ASSOCIATION

OUTSTANDING STEWARDS OF AMERICA'S WATERS AWARD

2019 OSAW Winners



Exelon - Muddy Run Observatory



Hydropower Foundation

2019 NHA Meetings

NHA Conferences & Symposiums

2019 Waterpower Week in
Washington April 1-3

NHA Annual Conference

International Marine
Renewable Energy
Conference (IMERC)

2019 NHA Hydraulic Power Committee (HPC)

NHA's Hydraulic Power
Committee (HPC) Fall
Retreat and Pumped
Storage Users' Committee
(PSUC) Fall Meeting
October 30—November 1
Roanoke, VA

2019 NHA Regional Meetings

Southeast Regional Meeting
February 11—Charleston, SC

Northeast Regional Meeting
June 5—Lowell, MA

Alaska Regional Meeting
August 20—Juneau, AK

Midwest Regional Meeting
with MHUG
October 2—Minneapolis, MN

CA Regional Meeting
December 11—Northern, CA



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