U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON ENERGY AND COMMERCE

March 13, 2017

TO: Members, Subcommittee on Energy

FROM: Committee Majority Staff

RE: Hearing entitled "Modernizing Energy Infrastructure: Challenges and Opportunities to Expanding Hydropower Generation"

I. INTRODUCTION

The Subcommittee on Energy will hold a hearing on Wednesday, March 15, 2017, at 10:00 a.m. in 2123 Rayburn House Office Building entitled "Modernizing Energy Infrastructure: Challenges and Opportunities to Expanding Hydropower Generation."

II. WITNESSES

- **Chuck Hookham, P.E.,** Director of NBD Services, CMS Energy, on behalf of the American Society of Civil Engineers;
- **Kieran Connolly**, Vice President of Generation and Asset Management, Bonneville Power Administration;
- **Ramya Swaminathan**, CEO, Rye Development, on behalf of the National Hydropower Association; and
- **Dave Steindorf**, California Stewardship Director, American Whitewater, on behalf of the Hydropower Reform Coalition.

III. BACKGROUND

There are approximately 90,580 dams across the United States serving a range of purposes, including electric generation, flood management, irrigation, recreation, navigation, and drinking water supply. Many of America's dams have exceeded their design life and are in need of modernization. By 2025, 70 percent of dams in the United States will be over 50 years old. According to the American Society of Civil Engineers, 15,500 of America's dams are classified as high hazard dams.[1]

Electricity generated from hydropower is an important contributor to the nation's energy mix, although there remains significant untapped potential. In 2015, hydropower accounted for

[1] *See* American Society of Civil Engineers, *2017 Infrastructure Report Card, Dams Report*

about six percent of total U.S. electricity generation and 46 percent of electricity generation from renewables.[2] Less than three percent of the dams in the U.S. – approximately 2,200 dams – produce electricity. A recent report by the Department of Energy (DOE) found that U.S. hydropower production could grow by almost 50 percent from current levels by 2050 from a combination of upgrading existing hydropower facilities, adding generation capacity to existing non-powered dams and canals, and developing new hydropower facilities.[3]

IV. BENEFITS OF HYDROPOWER

Electricity generated from hydropower is advantageous because it is clean and renewable, operationally flexible, and easily dispatchable. With these attributes, hydropower has the ability to improve grid reliability and security and enable the integration of intermittent renewable resources, such as wind and solar.

Hydropower technology has improved in recent years, reducing potential environmental and safety impacts, but continued innovation will be required to maximize hydropower's potential. Advancements in turbine and fish passage technology facilitate upstream and downstream movements of migrating species, ensure adequate oxygen levels, and minimize the degradation of aquatic habitats. Technological improvements for dam monitoring allow operators to monitor dams in real time, to respond to storms, floods, or other events that could place those living near the dam at risk.

Hydropower also provides benefits in the form of jobs, economic investment, improved public health, and resource conservation. DOE has identified the following expected future benefits from existing hydropower facilities:[4]

- 120,500 hydropower related jobs by 2050;
- $77 billion in cumulative economic investment;
- $58 billion in savings from avoided mortality, morbidity, and economic damages caused by electric power sector emissions of sulfur dioxide, nitrogen oxides, and atmospheric particulate matter; and,
- 30 trillion gallons of water withdrawals avoided by the electric power sector.

V. OWNERSHIP AND REGULATORY STRUCTURE

The ownership and regulatory structure of hydropower in the U.S. is complex. Almost half of the installed hydropower capacity is Federal and is under the ownership of one of three agencies: the U.S. Army Corps of Engineers, the U.S. Bureau of Reclamation, and the Tennessee Valley Authority. While the Federal government owns and operates hydropower facilities on Federal dams, non-Federal hydropower facilities are also located on Federal dams.

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[2] *U.S. Energy Information Administration, Hydropower Explained.*
[3] *U.S. Department of Energy, Hydropower Vision (2016).* DOE found that U.S. hydropower could grow from 101 gigawatts (GW) of combined generating and storage capacity to nearly 150 GW by 2050, with more than 50 percent of this growth realized by 2030.
[4] Id.

Multiple government entities and agencies participate in the regulation of hydropower. The Bureau of Reclamation and the U.S. Army Corps of Engineers regulate Federal hydropower. DOE's four Power Marketing Administrations – the Bonneville Power Administration, the Southeastern Power Administration, the Southwestern Power Administration, and the Western Area Power Administration – have the responsibility for marketing hydropower from Federal hydropower facilities. Power Marketing Administrations are required by law to sell wholesale electric power at the lowest possible rates to consumers consistent with sound business practices, with preference given to publicly or cooperatively owned utilities.[5]

The Federal Energy Regulatory Commission (FERC) regulates non-Federal hydropower, including over 1,600 hydropower projects at over 2,500 dams. FERC's responsibilities include the issuance of licenses for the construction of new hydropower facilities, relicensing existing hydropower facilities, and oversight of all ongoing hydropower operations, including dam safety inspections and environmental monitoring. Under the Federal Power Act, non-Federal hydro projects must be licensed by FERC if they are located on a navigable waterway; occupy Federal land; use surplus water from a Federal dam; or, are located on certain non-navigable waters that affect interstate or foreign commerce. FERC generally issues licenses for terms of between 30 and 50 years.

VI. CHALLENGES TO MODERNIZING AND EXPANDING HYDROPOWER

Licensing new hydropower facilities and relicensing existing facilities requires extensive consultation with multiple Federal, State, and local government entities. The process routinely requires seven to ten years to complete and costs tens of millions of dollars. The cost and duration of the licensing process creates significant uncertainty and has the potential to delay or prevent investments that would improve operational efficiency and safety.

Due to the aging state of America's hydropower infrastructure, the number of hydropower facilities in need of relicensing continues to rise. As a result, projects undergoing relicensing make up the majority of proposals under review by FERC. Between FY 2016 and FY 2030, over 500 projects, which represents about 50 percent of FERC's licensed projects, will begin the relicensing process.[6]

Despite available generation potential, there are also market challenges to expanding hydropower generation. Over the years, Federal and State policies and market changes have affected the value of hydropower and the economic viability of existing and future projects. Regulatory and permitting uncertainty, coupled with uncertainty regarding guaranteed revenue over the long life of hydropower assets, are important factors that can affect or delay project financing.

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[5] Each Power Marketing Administration (PMA), and sometimes each system of dams or even a single dam within a PMA, has its own enabling statute. As a result, administration of the PMAs is extremely complex.

[6] *See Testimony of Anne Miles, Director of the Office of Energy Projects, FERC, before the Subcommittee on Energy and Power, March 13, 2015.*

VII. ISSUES

The following issues may be examined at the hearing:

- The current state of hydropower infrastructure in the United States;
- The benefits of hydropower and the potential for new hydropower development;
- The role of Federal, State, and local governments in the hydropower licensing and relicensing process;
- Regulatory compliance costs and impacts to ratepayers; and,
- Challenges and opportunities to expanding hydropower generation.

VIII. STAFF CONTACTS

If you have any questions regarding this hearing, please contact Brandon Mooney or Tom Hassenboehler of the Committee staff at (202) 225-2927.