Chapter 1

Water Power

Water power in early America powered the Industrial Revolution. Today, water power is an important energy source for generating electricity (hydroelectric power) and has the potential to be one of the most abundant sustainable sources of energy. Hydroelectric power highlights the balance between developmental goals and environmental concerns.

This chapter looks at the historical use of water power, along with its evolution over time. It describes the way in which hydropower projects are approved and licensed. And it offers look into the future of hydrokinetic power.

According to the energy “input/output” chart (below), renewable energy sources constituted about 9.4% of all energy produced in the United States in 2013, with hydropower representing about 35% of the U.S. renewable portfolio – the largest component!

In this chapter, you will learn about:

- The development of early water mills and the impact on the property rights of adjacent landowners.
  - The judicial enforcement of common law remedies of trespass and nuisance to protect landowners affected by adjacent water mills.
  - The promotion of water mills (and industrialization) through legislative limits on monetary compensation to adjacent property owners.

- The spread of water power in the early 20th century and the changing regulatory environment.
  - The conflict between the private sector and public sector in developing hydroelectric power.
  - The view that the nation’s waterways are a public resource, subject to public use and not private control.

- The expansion of federal jurisdiction over water power projects and the FERC licensing and permitting process for hydropower facilities.
  - Congressionally-created exemptions to FERC licensing for certain independently owned hydroelectric projects
  - The accommodation of the interests presented by environmental groups in the licensing of hydropower projects.

- FERC relicensing of hydropower projects.
  - The current trends in FERC licensing and re-licensing of hydropower projects.
  - The relevance of environmental concerns in the re-licensing of hydropower projects.

- The potential for hydrokinetic development
  - The different ways in which ocean waves and tidal movements can be used to generate electricity
  - The regulation of offshore hydrokinetic power generation and recent trends in the licensing of such projects.
Chapter 1 - Water Power

1.1 Water as Source of Energy
   1.1.1 Water mills: a historical perspective
   1.1.2 Hydroelectric power: public or private?

1.2 Hydroelectric Power
   1.2.1 Regulatory landscape
   1.2.2 FERC licensing
   1.2.3 FERC relicensing
   1.2.4 The Current Trend
   1.2.5 Licensing of Federally Owned Hydropower Projects

1.3 Marine and Hydrokinetic Energy
   1.3.1 Marine and Hydrokinetic Technology
   1.3.2 Regulatory Landscape

Sources:
• Michael B. Gerrard et al., The Law of Clean Energy: Efficiency and Renewables 479 (1st ed. 2011).
1.1 Water as a Source of Energy

For much of human history, society has looked for ways to transfer the potential energy of moving water into useful kinetic energy. Whenever water is located above the level where it seeks to flow, it possesses potential energy from the downward force of gravity. Today, water is one of the most important sources of energy on the planet. In the United States, more electricity is produced from water than from any other method of renewable source. In 2014, water power accounted for 55% of renewable U.S. electricity production, representing 6.8% of total U.S. electricity generation (there are about ~2,400 conventional hydro facilities nationwide). Also in 2014, the state of North Carolina generated 4.6% of its electric power from hydropower. EIA, “NC State Energy Profile.”

Hydropower offers substantial benefits as a form of energy production, including electricity generation. It has no air emissions, low operating costs, stable generation output, and such ancillary benefits as flood control and irrigation. But hydropower is not a panacea. There are drawbacks, including the detrimental environmental impact of hydropower dams on natural river systems (and fish and wildlife populations) and the interference with navigation on waterways. The development of hydropower resources as well as the pros and cons associated with this type of generation technology are further explored below.

1.1.1 Water mills: historical perspective

The water mill was one of the first devices to use the potential energy stored in water. Wikipedia, “Water Mill.” A water mill uses the force of flowing water to power a wheel, which in turn operates machinery. Water mills – which were invented before windmills – were a substantial improvement to grinding grain manually or by animal power.

To more effectively harness the energy from flowing water, large millponds or reservoirs were created. This allowed the mills to run continuously and evenly. As watermill technology improved, millponds became larger and larger. These larger reservoirs inundated and diminished cultivation opportunities on the available surrounding farmland, and the damming of streams and rivers lead led to less water flow down stream, which had negative impacts on negatively impacting the environment and the landowners downstream.

Mill towns emerged in New England, and water mills shaped the textile industry in the early American economy. The industry spread inland along the rivers of New England, and the mill towns become major economic centers in close proximity to rail / maritime travel for the transportation of the goods produced by the mills.

Water mills and property rights. The development of mills impacted the property rights of those surrounding the millpond, and also demonstrated the willingness of Americans to sacrifice the rights of private property owners in favor of economic development. In 1713, Massachusetts was the first colony to enact a statute that provided for compensation of landowners whose property was flooded by mill dams. Massachusetts’s courts, however, continued to recognize the traditional common law remedies for trespass and nuisance, making the statute essentially
superfluous. In the late 1790s, the Massachusetts legislature amended the statute to make it the *exclusive* remedy for landowners whose lands were flooded by mill owners. Subsequently, other states adopted the Massachusetts model -- a significant step toward devaluing property rights and changing real estate into an economic commodity.

An early case illustrates the early judicial response to mill development in the United States. *Fiske v. Framingham Manufacturing Co.* (Mass. 1831). The case involved a Massachusetts statute that permitted any owner of a mill situated along any non-navigable stream to raise a dam and flood the land of his neighbor, so long as he compensated the neighbor. The injured party was limited to yearly damages, rather than a lump sum payment, even if the land was permanently flooded. The statute did not explicitly distinguish between natural and man-made streams. The court, however, held the law was only intended to cover damages resulting from natural streams, thus not covering the man-made stream at issue in the case. Further, the court held the statute did not authorize the making of a canal or artificial stream so as to lead the water into the lands of another.

Thus, by finding the Massachusetts statute did not apply, the *Fiske* court allowed the plaintiff to pursue his common law remedy. The case illustrates the legal response to the developing industrial age; as mills began to get larger, the result was more flooding, larger millponds, and more “taking” of neighboring lands. The importance of the *Fiske* decision is that it shows the court’s flexibility regarding developments in water power, and its ability to adjust outdated laws and statutes to changing times.

Other states were also reluctant to embrace the pro-development philosophy of the mill acts. For example, Virginia's mill act required millers to obtain court permission before flooding nearby land to ensure that fair damages were paid to surrounding landowners. In addition, Virginia courts interpreted the act strictly and often denied permission for flooding based on technicalities. Although the importance of the mill acts has waned over time, modern courts continue to view with suspicion the “private takings” that they permit. See *Dorey v. Estate of Spicer*, 715 A.2d 182 (Me. 1998) (interpreting Maine's mill act, modeled on the Massachusetts statute, not to apply to landowner who sought to raise height of private dam on pond and flood pondfront land owned by others).

1.1.2 Hydroelectric power: evolving landscape

In the early 20th Century, the technology to turn water flow into electricity became more widespread, which led to a search to find the most efficient way to produce hydroelectricity. As a byproduct of this changing landscape, the U.S. Congress passed a series of statutes to govern hydroelectric power. A fundamental question became whether hydroelectric power generation would be left to the private sector or the government. Congress and the courts were left to balance the benefits of free-market capitalism with concerns for the environment and maximizing social utility.

**Concerns over hydropower.** While hydropower’s air emissions are negligible, if a large amount of vegetation is growing along the riverbed when a dam is built, it can decay in the reservoir and cause a buildup and release of methane gas. Furthermore, dam creation alters the flow of rivers
and affects the wildlife and people who depend on these rivers. Colder, oxygen-depleted water at the bottom of a reservoir is inhospitable to fish and when released into the river can kill fish downstream. The release of dam water can also cause flooding downstream, disrupting plant and wildlife habitats and affecting drinking water supplies. Finally, hydroelectric dams can cause erosion along riverbeds both upstream and downstream, thus reducing sedimentary deposits and water quality along a dammed river.

**Federal government’s response.** In 1920, Congress passed the Federal Water Power Act and later broadened in the Federal Power Act of 1935 (FPA). The FPA created a licensing program for hydropower, and delegated that responsibility to the Federal Power Commission (FPC) (predecessor to the Federal Energy Regulatory Commission (FERC)). Congress also created new federal agencies to construct federally-owned hydropower facilities, such as the Colorado River’s Hoover Dam and the Columbia River’s Grand Coulee Dam.

The role of the federal government’s regulation of hydroelectric power expanded with Franklin Roosevelt’s election as President and his 1930s “New Deal” legislation. The Tennessee Valley Authority (TVA) was created in 1933 as a federal agency with a monopoly on hydroelectric generation along the Tennessee River and its tributaries. Similarly, the Bonneville Power Authority was created in 1937 to oversee the Columbia River.

Looking at the trends from the first millpond cases through the public work projects of the 1930s, it is easy to see a shift in policy away from the private economic rights to collective interests in energy development. As the country grew it became increasingly important to allocate resources and ensure fair prices for hydropower throughout the country. At the same time, the large hydro projects created an awareness among Americans of their environmental surroundings, and the relationship between economic development rights and environmental protection.

**Public hydroelectric power.** From the start of his political career in the 1920s, FDR expressed his belief that investor-owner power plants should have competition -- notably from the federal government. Soon after taking office, he initiated his National Power Policy not only to bring interstate electricity under federal public utility regulation, but also to make electricity more available at a cheaper rate. Hydropower as a federal public works program was a key element to this access to more affordable electricity. Several major initiatives were undertaken during the Great Depression to promote energy production and distribution – thus to spur economic activity.

**Tennessee Valley Authority.** The Tennessee Valley Authority (TVA) was approved by Congress in 1933 and established a three-member board with eminent domain powers to construct dams, reservoirs, powerhouses, power structures, and transmission lines. The agency was empowered to produce, distribute, and sell electric power with a preference to states, counties, municipalities and co-ops, not organized for doing business for profit. The facilities were meant to be operated as public projects. Due to environmental and other roadblocks to dam construction, there were many slowdowns and conflicts between TVA and private sector counterparts, who felt they were being discriminated against. See Wikipedia, “Tennessee Valley Authority.”
Rural Electrification Act. Another FDR initiative was the Rural Electrification Act of 1936, which subsidized rural electrification to give electricity to as many farms as possible. To give this effect, Congress appropriated $100 million for the government to originate loans to both public and private parties that would finance electrical connections with rural areas. The funding was channeled through cooperative electric power companies, most of which still exist today. These member-owned cooperatives purchased power on a wholesale basis and distributed it using their own network of transmission and distribution lines. See Wikipedia, “Rural Electrification Act”.

Bonneville Power Administration Act. The third major initiative was the Bonneville Power Administration Act of 1937, which used federal money to develop water resources in the Pacific Northwest. Again, this was one of FDR’s public works campaigns and is quite similar to the TVA, just in a different region. The power generated on the BPA's grid is sold to public utilities, private utilities, and industry. The excess is sold to other grids in Canada and California. The BPA is a public entity and therefore does not make a profit on power sales or transmission services. BPA also coordinates with the U.S. Army Corps of Engineers and the U.S. Bureau of Reclamation to regulate flow of water in the Columbia River and to carry out environmental projects such as salmon restoration. See Wikipedia, “Bonneville Power Administration”.

Environmental awareness. The expanded development of hydropower had environmental impacts. The case of Udall v. Federal Power Commission, 387 U.S. 428 (1967), highlighted the emerging conflict between hydroelectric power development and the nation’s waterways as a public resource. This case signaled the emergence of environmental sensitivity that led to much of our environmental legislation. The primary issue in the case was whether the Federal Water Power Act of 1920 allowed for a licensing of a private, state, or municipal agency as a satisfactory alternative to federal development.

The Supreme Court ruled that the test for whether a private company can acquire a license to create a hydroelectric facility turns on whether the project will be in the public interest. This is determined by considering whether the region will be able to use the additional power, future power demand and supply, alternate sources of power, the preservation of fish for commercial and recreational purposes, and the protection of wildlife. While the Court did not make a decision on the merits, its ruling ensured that recreational and environmental issues would be considered in any determination as to the licensing of a hydroelectric facility.

1.2 Licensing of hydroelectric power projects

In the United States, every hydropower project must undergo a licensing process to determine whether and how the projects should be developed. This process varies depending on whether the proposed hydro facility is federally owned or non-federally owned. Generally speaking, all hydropower projects require federal approval, but the source of such federal approval differs depending on whether the facility is privately or federally owned/operated.

1.2.1 Regulatory landscape
The majority of hydropower projects in the United States are owned and operated by non-federal entities – that is, investor-owned utilities, independent power producers and local governments. The FPA established a complete scheme of federal regulation of water power projects through a centralized and consolidated federal jurisdiction over hydropower development. This oversight originally rested with the Federal Power Commission and now the Federal Energy Regulatory Commission.

**FERC jurisdiction.** The FPA requires FERC licensing for that the construction, operation or maintenance of a hydro project if the project is (i) located on a navigable waterway; (ii) located on a non-navigable waterway subject to Commerce Clause jurisdiction; or (iii) affects interstate or foreign commerce. 16 USC § 817(1). Although as a practical matter nearly all hydro projects in the United States fall under FERC jurisdiction, the FPA gives little guidance on the Commission’s jurisdiction to issue a license, a lengthy administrative process.

What is the extent of FERC jurisdiction over hydropower projects? FERC addressed its jurisdiction -- specifically the navigable waters and the Commerce Clause tests -- in *Fairfax County Water Authority*, 43 F.E.R.C. ¶ 61,062 (1988). In the case, Fairfax County developers wanted to build two hydroelectric plants on the Occoquan River to provide power generation for a water supply pumping station in the town of Occoquan. When the developers failed to seek a FERC license, the Commission brought a proceeding arguing that the county was required to file for a license given that the waters of the Occoquan River were navigable, thereby affecting interstate commerce.

On the definition of “navigable waters,” FERC explained that waters are considered navigable if suitable for the transportation of people or goods in interstate or foreign commerce, and waterfalls connected to navigable waters are also considered navigable. Although the Occoquan River varies in width from 5 miles to 75 yards, Fairfax County claimed that the hydroelectric plants were located where the water was neither wide nor deep enough to be navigable. FERC, however, relied on a 1938 FPC study that had found the sites at issue in the case were in fact on navigable waters.

The “navigation in fact” test used in the *Fairfax* proceeding has also been used by courts. The controlling judicial test to determine whether a waterway is navigable focuses on whether (1) the waterway is in use or suitable for use, or (2) was used or suitable for use in the past, or (3) could be made usable by reasonable improvements. *Rochester Gas and Elec. Corp. v. Federal Power Comm’n*, 344 F.2d 594, 596 (2d Cir.), cert. denied, 382 U.S. 832 (1965).

On the question in the *Fairfax* proceeding of what “affects interstate commerce,” FERC rejected the argument that the Commerce Clause was not implicated because all energy produced at the two sites was to be used on-site. FERC pointed out that the Supreme Court had established in *Wickard v. Filburn*, 317 U.S. 111 (1942), that purely local activities can be regulated under the Commerce Clause if they belong to a class of activities that, as a whole, affect interstate commerce. FERC concluded that using self-generated power would cause Fairfax County to buy less power from other sources, which would implicate interstate commerce and the Commerce Clause. Therefore, the Commission ruled that Fairfax County had to seek a license for its
proposed facilities because they were located on navigable waters, implicated the Commerce Clause and interstate commerce, and were built after August 26, 1935.

The *Fairfax* decision is consistent with a long line of Supreme Court cases that extend federal jurisdiction over any electric system connected to a network of power lines that crosses state lines. For example, in *Federal Power Comm’n v. Union Elec. Co.*, 381 U.S. 90, 96 (1965), the Supreme Court gave an expansive reading of “affecting the interest of interstate commerce” and concluded Congress had invoked “its full authority over commerce, without qualification, to define what projects on non-navigable streams are required to be licensed.” Thus, if a post-1935 project on a Commerce Clause waterway affects any of the broad range of interstate interests, it must be licensed. *See also Federal Power Comm’n v. Florida Power & Light Co.*, 404 U.S. 453 (1972) (concluding that hydropower projects, whether they generate or do not generate power, affect the functioning of the interstate energy and thus interstate commerce, by affecting power that other resources must produce to keep the system balanced); *New England Power Co. v. New Hampshire*, 455 U.S. 331 (1982) (holding that FERC has regulatory jurisdiction over transmission service performed by a utility connected to the interstate network).

In short, it’s hard to imagine a non-federally owned hydropower project that does not fall under FERC jurisdiction because virtually all electric systems are connected except for those in Hawaii and Alaska. However, Congress has never chosen to state that its power extends that far, to the majority of regulations remain with state governments. (Discussed later in the semester).

### 1.2.2 FERC licensing

Once FERC’s jurisdiction has been established, the licensing process begins. The FPA authorizes FERC to license hydroelectric sites when it is “in the public interest.” 16 USC § 797(e). The FPA requires the Commission to evaluate each case and determine if the project is “best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, for the adequate protection, mitigation, and enhancement of fish and wildlife...and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes.” 16 USC § 803(a). Beyond these statutory directives, FERC has full authority to license both new and already-built hydroelectric facilities.

**Preliminary permit.** FERC begins the licensing process for a new facility by issuing a preliminary permit. The only purpose of this permit is to allow the applicant to study the location on which it hopes to build its project, as well as defend against any other project developers.

**Licensing process.** From the time the FPA was enacted, there has been a tug-of-war between economic development and the environment impact of licensing a hydropower project. Conservation organizations have raised a wide variety of environmental concerns from aesthetic and recreational impacts to the potential disruption of local fish species.

An example of the balancing of economic and environmental concerns arose in *Yakima Confederated Tribes & Bands of Yakima Indian Nation v. F.E.R.C.*, 746 F.2d 466 (9th Cir. 1984). In the case FERC had granted a hydroelectric plant license to Chelan County Public
Utility District No. 1 for a term of 40 years. Various Indian groups challenged the order on the ground FERC had erred when it licensed the project without waiting for a completed environmental impact statements. The court reversed FERC’s license and required it (and other and other participating agencies) to undertake more research to determine the impact the project would have. In particular, the court ordered further study of how the placement and construction of the proposed hydroelectric facilities would impact the environmental, aesthetic, and recreational aspects of the affected waterways.

Despite the many environmental and wildlife concerns raised by hydropower projects, FERC rarely denies licenses for these reasons.

**Licensing and environmental considerations.** The FERC has a large amount of decision-making autonomy over environmental issues. The Supreme Court has concluded that the Federal Power Act’s broad grant of authority to the FERC preempts of state and local environmental laws by operation of the Supremacy Clause. See *First Iowa Hydro–Elec. Coop. v. Florida Power Comm’n*, 328 U.S. 152 (1946); and *California v. FERC*, 495 U.S. 490 (1990). Therefore, while state and local government agencies can participate in the licensing process, they cannot force the FERC to enforce its point of view. Thus, environmental issues are often contentious in the hydropower licensing process because there is little recourse to environmental groups after the license is issued.

What standard of review do courts use in reviewing a hydropower project’s environmental impact? In a landmark 1965 decision concerning the environmental impact of federal agency decision making, the D.C. Circuit held the FPC (now FERC) was required to properly weigh all the FPA factors and to give “full consideration to alternative plans.” *Scenic Hudson Preservation Conference v. Federal Power Commission*, 354 F.2d 608 (D.C. Cir. 1965). The case thus created a heightened standard of review for agency action that could impact the environment. In the case, FERC had granted a license to Consolidated Edison to construct the world’s largest pumped storage hydroelectric project (where water would be held in reserve for use during peak load periods) on the Hudson River in New York. The project called for a storage reservoir, a powerhouse, and transmission lines. In response, the Scenic Hudson Preservation Conference formed to oppose the project on the grounds it threatened local water supplies, fisheries, and scenic beauty.

The *Scenic Hudson* court concluded that the phrase “recreational purposes” in the FPA, encompasses the conservation of natural resources, the maintenance of natural beauty, and the preservation of historic sites. The court further held it was the statutory duty of the Commission to properly weigh each factor before issuing a license – including a duty to give full consideration to alternative plans. The court determined that the Commission had not sufficiently attempted to gather evidence of possible alternatives, assess the project’s potential impact on the environment, consider the project’s costs, and weigh the public convenience and necessity. Ultimately, the court instructed the Commission to reexamine the issues in a new proceeding that included a focus on the preservation of natural beauty and historic shrines.

The *Scenic Hudson* case reinforced a citizens’ right to participate in environmental disputes and in the formulation of federal and state regulation of the environment. Its holding was soon
expanded and embodied in the National Environmental Policy Act of 1968 (NEPA), 42 USC § 4331 et seq., which requires all federal agencies to review the environmental impacts of projects before their approval – and to prepare an Environmental Impact Statement (‘EIS’) for any “major federal action significantly affecting the quality of the human environment.” NEPA § 102(c); 42 U.S.C. § 4332(c) (1998). Thus, NEPA requires FERC to analyze and consider environmental impacts when granting and reissuing a hydropower license. An EIS, however, is not required if the agency makes a “Finding of No Significant Impact” (FONSI) and gives reasons for its conclusion. In fact, most agency actions include a finding that NEPA compliance and an EIS are not necessary.

In practice, the FERC prepares an EIS for very few hydroelectric licensing proceedings. The Commission, however, routinely prepares an “Environmental Assessment,” a shorter and less procedurally cumbersome analysis of environmental impacts required by NEPA for proposed hydro projects. Thus, NEPA -- like the Scenic Hudson decision -- requires the FERC to analyze environmental impacts, though not necessarily in an EIS.

As a result, applicants for FERC hydropower licenses must address potential environmental concerns prior to filing their license applications. This is primarily accomplished through a pre-filing consultation process during which applicants seek input on their project plans from local, state, and federal resource agencies. Once these agencies are consulted, applicants incorporate responses to the agencies’ concerns in their project proposal. Failure to comply with the pre-filing consultation process can result in FERC’s denial of a prospective licensee’s application.

**Integrated licensing process.** What does the current FERC review process look like? In 2003, FERC established the Integrated Licensing Process (“ILP”) in response to concerns about the large transaction costs associated with its licensing process. The ILP streamlined the licensing process for the purpose of creating an efficient system for licensing new projects and relicensing existing projects, while considering the environmental impact of the project. The ILP allows for the pre-filing consultation and early stages of the NEPA review to occur at the same time. The ILP is now the default licensing program.

The ILP took the environmental pre-filing process even further by requiring applicants to notify all parties that could potentially be affected by a proposed project -- including federal resource agencies and Indian tribes, local governments, and general members of the public who may have an interest in the proceedings. The notification includes basic information such as the applicant’s name and address, his intention to file for a license, the type of project to be undertaken, and the project’s location. 18 CFR § 5.5(b). The applicants must also provide the interested parties with a pre-application document that contains details about the project. 18 CFR § 5.5.

Once a government agency receives a ILP pre-application packet, the agency may submit comments on the document within a certain amount of time. These comments are then used by FERC to initiate an environmental assessment, otherwise known as “scoping,” that will determine whether a license should be granted. Under the ILP, interested parties still have a chance to intervene regarding environmental issues even after an application has been accepted. After all disputes are resolved, FERC makes a final decision regarding the issuance of a license.
**State participation.** States do not license or directly regulate hydropower projects. The FPA and other federal laws, however, grant states significant involvement and authority in FERC licensing. For example, the FPA requires that license conditions be “best adapted” for the waterways in which the hydro project in question will be constructed. FPA §§ 4(e), 10(a). In considering what is “best adapted,” FERC gives consideration to the opinions of state entities.

In addition, Section 401 of the Clean Water Act (CWA) requires any applicant for a federal license or permit to secure from the appropriate state environmental agency a “certification… that any… discharge [from the project] will comply with [the CWA].” 33 USC § 1341(a). While hydroelectric projects are not required to secure permits under the CWA because they do not add pollutants to the waterways, receiving a Section 401 certification is oftentimes not a simple task. State agencies have increasingly looked at Section 401 as a way to extract concessions from applicants in the hydroelectric licensing process.

Courts initially interpreted the Section 401 certification requirement as a narrow one that only granted state agencies’ power to regulate in the realm of water quality. However, in 1994 the Supreme Court broadened the Section 401 certification to allow states to impose any limitations needed to ensure a licensee is in compliance with the CWA. *PUD No. 1 of Jefferson County v. Washington Dep’t of Ecology*, 511 U.S. 700 (1994). In the case, the court held that a state can assure compliance with appropriate state law requirements when a local utility district is seeking to license a hydropower project.

**Small hydro projects.** In 1978, Congress passed the Public Utility Regulatory Policies Act (PURPA), 16 USC § 2601 et seq. Among other things, PURPA required electric utilities to purchase power at “avoided cost” rates from independently-owned hydroelectric power producers -- up to 15 MW for non-municipal developers and 40 MW for municipalities. As a result, FERC received a large number of licenses for small hydroelectric projects. In 1995, the Energy Security Act (ESA) extended the program to include projects up to 5 MW at existing dams and those using natural water features to generate electricity “without the need for any dam or impoundment.”

Some environmental groups objected to these new projects and urged greater FERC review of the projects’ environmental impact. For decades, environmentalists had been arguing that FERC did not pay enough attention to environmental concerns while making licensing decisions. See *Nat'l Wildlife Fed'n v. F.E.R.C.*, 912 F.2d 1471 (D.C. Cir. 1990) (challenging FERC licensing of proposed dam event though its environmental impact had not been considered). Also during this time, membership in conservation groups such as the Sierra Club, the National Wildlife Federation, the Wilderness Society, and the National Audubon Society experienced a significant increase. As a result, FERC created many of the environmental requirements that we see today -- such as notifying all interested parties of the project and including environmental concerns in the application.

1.2.3 **FERC relicensing**

When a hydroelectric license expires, the licensee must have its project relicensed in order to maintain the dam. During these relicensing proceedings, a license for an existing project can be
reopened for application from parties other than the current licensee. Prior to the 1990s, municipalities seeking to bid on a license at its relicensing stage were given preference over the existing licensee. The concerns of both environmentalists and the licensees seeking to abolish the municipal preference brought about legislative reform in the Electric Consumers Protection Act of 1986 (ECPA), 16 USC § 791 et seq. The ECPA abolished the municipal preference in relicensing proceedings to ensure that new competing proposals would have to be truly superior to an incumbent’s proposal to gain the license.

The ECPA also granted environmentalists the stricter requirements they sought. The ECPA required FERC to give “equal consideration” not only to “power and developmental purposes [of an application for a license],” but also to “energy conservation…fish and wildlife…recreational opportunities, and the preservation of other aspects of environmental quality.” 16 USC. § 797(e). In addition, the ECPA required FERC to consider the impact multiple dams may have on a single river and its surrounding area. This is known as a “cumulative impact assessment.” It also required FERC to accept and include in hydroelectric licenses any conditions recommended by state or federal resource agencies (including those by environmental regulatory agencies) or to otherwise explain in writing why it rejected the recommended conditions. 16 USC § 797.

**Removal of dams.** After the passage of the ECPA in 1986, environmentalists argued that many hydroelectric projects up for relicensing in the 1990s ought to be decommissioned and have their dams removed, rather than be relicensed. There was a major concern regarding how these projects had impacted local fish populations.

In 1994, the FERC responded to these concerns by issuing a policy statement declaring that the agency had the authority to remove existing hydroelectric dams. In 1997, the FERC did just that – ordering the removal of the Edwards Dam on the Kennebec River in Maine at the owner’s expense. *Edward’s Mfg. Co. and City of Augusta, Me., Order Denying New License and Requiring Dam Removal, 81 F.E.R.C. ¶ 61,255 (1997)*. The project had been in place since the early 1800s, yet due to opposition from various conservation groups, agencies, and recreational associations FERC chose to deny the dam’s relicensing petition and ordered removal of the dam. FERC concluded, “that the project’s negative impact on fishery resources could not be mitigated except by removal of the dam.” Today, relicensing procedures have created increasingly heated debates as environmental groups, as well as others, have argued for the removal of other hydroelectric power plants.

**Environmental considerations in relicensing.** Another re-licensing case on the Kennebec River illustrates the weight environmental considerations have played with FERC. In *Merimil Limited Partnership, Project No. 2574-032, Order Issuing New License, 110 F.E.R.C. ¶ 61,240 (2005)*, the applicant Merimil sought to renew the license of its dam on the Kennebec River in Maine -- the “Lockwood Project” dam. The river was home to a wide variety of fish, including the American shad, alewife, and Atlantic salmon -- all three of which migrate upstream. Recognizing this, the license for the Lockwood Project had provided that the licensees would “trap and truck operations at the projects, to install and operate permanent downstream and upstream fish passage facilities according to a schedule, and to conduct studies related to the restoration efforts.” Under the license, permanent passageways were to be in place for the fish by May 1999.
The licensing agreement, however, was altered in 1998 to delay the earlier agreement on permanent passageways on the Lockwood Project. Rather than building permanent passageways by a certain date, the revised license provided for fish passageways to be constructed upon certain biological triggers. In its opinion renewing the Lockwood Project license, FERC found no issue with water quality, threatened and endangered species, or the recommendations of federal and state fish and wildlife agencies.

Nonetheless, the Friends of the Kennebec Salmon, an environmental group, argued that the Lockwood Project would not allow a sufficient number of Atlantic salmon, American shad, and alewives to swim upstream to spawn and regenerate their populations. Citing statistics of increased populations of shad and alewives, FERC determined that the 1998 licensing agreement sufficiently protected these fish and issued a new 31-year license to Merimil.

Clear from this decision is that, although the concerns of environmental groups have become a factor in FERC’s re-licensing of hydropower facilities, such considerations do not automatically trump the other factors.

1.2.4 Current Trends

Over the past few years hydro projects, especially small-scale hydro projects, have experienced a “miniboom.” From 2009 to 2012, FERC issued new licenses or re-licensed sixty-four hydropower projects. See FERC, “Issued Licenses since 2007.” See also Dan Tarlock, Hydro Law and the Future of Hydroelectric Power Generation in the United States, 65 Vand. L. Rev. 1723, 1758-59 (2012). Further, FERC has promoted hydropower projects, soliciting input on how to improve the licensing process for small hydropower projects and entering into agreements with other federal agencies to facilitate project development at certain federal facilities and on federal lands.

In August 2013, Congress passed two laws -- the Hydropower Regulatory Efficiency Act and the Bureau of Reclamation Small Conduit Hydropower Development and Rural Jobs Act -- to improve and streamline the licensing process for small hydropower projects. Both received strong bipartisan support. See FierceEnergy, “Obama signs hydropower bills into law”.

Despite increased FERC licensing of hydro projects, the Supreme Court has signaled that private property interests may sometimes trump government-approved hydro development. In Arkansas Game & Fish Comm’n v. United States, 133 S. Ct. 511 (2012), the Court held that a government induced temporary flooding may be covered by the Takings Clause. This may reflect a newer trend toward protecting landowners when it comes to regulating public waterways.

1.2.5 Licensing of Federally Owned Hydropower Projects

How does licensing happen for hydro facilities that are federally owned/operated? Such facilities are not licensed by FERC, but rather governed by regulations adopted pursuant to the Congressional legislation authorizing the specific facility. For example, the Hoover Dam on the Colorado River and the Grand Coulee Dam in Washington, both projects authorized by federal statute, were constructed and are operated by an instrumentality of the federal government. There
are over 150 federally owned/operated hydropower dams across the United States operated by agencies such as the U.S. Army Corps of Engineers, the Bureau of Reclamation, and the Tennessee Valley Authority.

1.3 Marine and Hydrokinetic Energy

Distinct from hydroelectric generation, hydrokinetic technology holds the potential to supply between 2-5% of the world's energy needs and 10% of the current US energy consumption. Despite their potential, hydrokinetic technologies are not expected to be able to contribute significantly to US power supplies soon. In 2012, regulators approved the first licenses for commercial hydrokinetic energy projects off the coast of Oregon and in New York’s East River. See EIA, “Regulators approve first commercial hydrokinetic project in United States”.

In June 2014, the EPA announced the Clean Power Plan with the goal of reducing emissions from existing power plants by 30% by the year 2030. As part of the Plan, the US Energy Department pledged $4 million to advance hydrokinetic research, reflecting the importance of hydrokinetic energy in meeting the lower emissions goal.

1.3.1 Marine and Hydrokinetic Technology

FERC estimates that developing new hydrokinetic technologies holds the potential to double hydropower production. Each project could produce in the 10,000 MW to 20,000 MW range, enough to power about 900 to 1,800 U.S. homes for a year. In addition, marine and hydrokinetic energy technologies promise predictable power generation close to population centers along the coast.

Hydrokinetic generation technology. Unlike a hydroelectric dam, which artificially restricts the flow of a waterway to generate sufficient water pressure to drive a turbine, marine and hydrokinetic generation converts the existing mechanical energy of moving water into electricity. Theoretically, any source of moving water can be tapped for its hydrokinetic energy. Flowing rivers, tide-waters, waves, and deep-sea ocean currents are all potential sources.

Examples of hydrokinetic generation include wave power buoys that capture the energy in the up-and-down movement of waves, generating power that can be transmitted by an underwater cable to the electric grid onshore. Underwater turbines use water currents in rivers, tidal areas or the open ocean to spin underwater blades that generate electricity. Tidal power projects use water flowing between low and high tides to turn turbines that generate power. See EIA, “Regulators approve first commercial hydrokinetic project in United States”.

1.3.2 Regulatory Landscape

Under the current regulatory scheme, FERC has licensing authority and the U.S. Department of Interior (DOI) has leasing authority over hydrokinetic projects on the Outer Continental Shelf (OCS).
While streamlined procedures exist for the approval and licensing of hydrokinetic pilot projects under the FERC Hydrokinetic Pilot Project Licensing Process (HPPLP), such pilot projects must be temporary in nature, small in capacity, and removable on short notice. FERC, “Hydrokinetic Pilot Project Criteria”

FERC licensing of OCS hydrokinetic projects. FERC has asserted its jurisdiction over hydrokinetic projects situated on the OCS. See Pacific Gas & Electric Co., 125 F.E.R.C. ¶ 61,045 (2008). The OCS begins approximately three miles offshore and is considered the traditional boundary where state waters end. Thus, FERC has asserted licensing authority over deepwater hydrokinetic projects, particularly those seeking to harness tidal and wave resources.

But how exactly did FERC and DOI come to define the contours of their regulatory authority? Even after Pacific Gas, jurisdictional questions have lingered as to the contours of FERC’s authority in this area. The Energy Policy Act of 2005 amended the Outer Continental Shelf Lands Act to provide the Interior Department with parallel permitting authority with regard to the production, transportation, or transmission of energy from additional sources of energy on the outer continental shelf, including renewable energy sources.

In 2009, FERC announced an agreement with the Department of the Interior (DOI) on offshore renewable energy development that included revised guidelines for hydrokinetic project licensing and permitting. FERC & Dep’t of Interior, “Agreement on Offshore Renewable Energy Development”. The agreement gave the DOI jurisdiction to issue leases and gave FERC jurisdiction to issue licenses for hydrokinetic projects.

In July 2012, however, the DOI’s Bureau of Ocean Energy Management ("BOEM") and FERC revised the guidelines for the development of marine and hydrokinetic energy projects on the OCS. These guidelines reinforced the original 2009 agreement between FERC and DOI regarding the licensing/leasing distinction of their respective regulatory authorities. The guidelines also clarified the types of entities eligible to hold leases for hydrokinetic projects, the length of nature of such leases, and how a license or lease may be obtained. See Perkins Coie, “BOEM and FERC issue revised guidelines for offshore hydrokinetic energy development”.

FERC authority over experimental hydrokinetic projects. Can projects seeking to test the viability of hydrokinetic technologies avoid jurisdiction by not seeking to produce or sell electric power? In the early 2000s the developer of the Makah Bay Ocean Wave Energy Pilot Power Plant off the coast of Washington argued that its project was not subject to the FPA because it was not a hydroelectric project. FERC, however, determined that the Makah Bay Project was subject to its jurisdiction because it is located in “navigable waters” and that the wave-capturing buoys used in the project fall under the statutory mandate of the FPA. AquaEnergy Group, Ltd., 102 F.E.R.C. ¶ 61,242 (2002).

Later, in 2005, however, FERC determined that a proposal to test underwater turbines in order to study their potential impact on the environment and the performance capabilities of the new technology did not require a FERC-issued license. FERC, Declaration Order, Project 12178-001, Verdant Power (Apr 2005).
Shortly thereafter, FERC developed the HPPLP for new technologies. This expedited licensing process has a shorter timetable and would only be available for hydrokinetic projects that are small in scale, environmentally noncontroversial, and seek a short license term. Also, FERC instituted short-term conditioned permits that allow for hydrokinetic power generation contingent on the approval of other agencies when necessary. The contingent approval is necessary because the operation of hydrokinetic generators in the ocean may require approval by other agencies.

**Current FERC licensing of hydrokinetic projects.** As of 2012, a total of 84 “preliminary” permits had been issued for hydrokinetic projects, with a total projected capacity of more than 14,238 MW capacity (25 tidal, 4 wave, and 55 inland). Yet, as of July 2014, FERC had issued only five licenses for the development of hydrokinetic projects in the United States:

As of June 2014, pending permit applications totaled 13, with a proposed generating capacity of 3,941 MW:
Why has actual licensed projects been so much smaller – in number and capacity – than preliminary permits? The requirements for the preliminary permits needed to develop hydrokinetic resources represent a formidable barrier to hydrokinetic research and experimentation. The permits constrain how researchers and investors can test and employ these yet uncertain technologies. Outside of the HPPLP guidelines, a hydrokinetic facility can only be licensed under the same procedures that govern conventional hydroelectric installations. The requirements for the licensing of conventional hydroelectric projects were not written with hydrokinetic technology in mind and, as such, create unnecessary roadblocks for testing and commercialization. These regulatory restrictions make hydrokinetic projects risky investments, and the high risk combined with yet-unproven technology deters significant inflows of private capital into the field.

**FERC agreements with coastal states over hydrokinetic development.** Currently, FERC has signed a Memorandum of Understanding with California, Maine, and Washington regarding hydrokinetic projects. These agreements recognized the mutual interest in timely and efficient hydrokinetic development that the coastal states have with FERC. Information sharing, joint scheduling conferences, and other collaborative efforts are described in the memoranda which are designed to enhance the coordination of FERC with state authorities and avoid duplicative requirements imposed on hydrokinetic developers.