Chapter 41
Power plans

One of the key ingredients to the industrial production of aluminum is a commodity – alumina. Through much of the 20th century, alumina supplies on the market were determined by the Alcoa monopoly or the Big 3 oligopoly. Over time, as the vertical integration model was weakened by spot trading and Third World cartels, alumina became a global commodity much the same as crude oil. Electrical power is different from commodities – it can't be loaded in a boat and shipped overseas. Nevertheless, free market theorists have supported electrical power deregulation with hopes of trading electrons in an electronic marketplace. In the Pacific Northwest, regional power planning began with the creation and growth of the Bonneville Power Administration, which linked federal hydroelectric dams with transmission lines and power contracts. As the region's economy grew and it became clear that BPA power typically was cheaper than private power, regional planning increasingly mixed the two resources together. But as the region's economy grew, so did its demands. The aluminum plants that had been long-time BPA customers – providing reliable loads and the needed revenue to help pay for the system's hydroelectric dams and transmission systems – found themselves facing off against public interest groups, politicians and private utilities in the scramble for power resources.

Post-war aluminum

During World War II, power generated from the Columbia River was credited with producing the aluminum needed to build the planes that defeated Germany and Japan. In his fourth annual report in 1941, BPA Administrator Paul J. Raver reported that Alcoa's smelter in Vancouver, Wash., and Reynolds smelter in Longview, Wash., had produced nearly 30,000 tons of aluminum in the past fiscal year, and new plants were under construction at Tacoma, Wash., Spokane, Wash., and Troutdale, Ore. This accomplishment showed "the soundness of the principle of public ownership" of the region's main power supply system, he said. Raver also pointed out that development of defense industries helped

“to correct the unbalanced regional economy, which in the past has been too dependent upon agriculture and timber.” [1] In the decades following the war, the use of aluminum spread through the construction, transportation, electrical, packaging, machinery industries and other sectors of the economy. Automobiles used aluminum in transmissions, engines, trim, electrical systems, air conditioning, brakes and paint. The largest commercial aircraft became virtually all aluminum. New urban rapid-transit systems employed aluminum. In the food manufacturing industry, aluminum was increasingly used for packaging and canning. In the period following World War II, growth in aluminum production outpaced growth in the American gross national product by a ratio of two to one. [2]

Prior to World War II, aluminum was recognized as an important metal for its light weight and good electrical properties but was seen as lacking in strength, workability and production cost. All of this changed during the war. New and better alloys were introduced and production methods were improved to lower costs. Annual U.S. production of primary aluminum was 2,500 tons in 1900, rose to 163,500 tons by 1939 and then peaked at 920,000 tons during the war. After the war, production began to climb again to meet consumer demands and another war, this time in Korea. By 1954, output had increased to 1.4 million tons, exceeding domestic copper production. Following World War II, the government encouraged expansion of the aluminum industry by tax amortization and by agreeing to purchase aluminum for stockpiling. The availability of bauxite ore and cheap electric power were two limiting factors in the growth of the aluminum industry. Reserves of bauxite increased after World War II to more than 1 billion tons, as lower grades of ore became commercially usable. The construction of hydroelectric dams in the U.S. made cheaper power available. Hydroelectric dams provided power to 58% of the U.S. aluminum plants in 1955, with natural gas accounting for 35% and coal 7%. Aluminum fabricating also grew after World War II, resulting in 20,000 independent rolling, extruding, casting and forging plants operating in the U.S. by 1955. Market demand for aluminum products did not taper off following the conclusion of World War II, as demand shifted to the construction, railroad, truck and automobile industries. The President’s Materials Policy Commission expected aluminum consumption to reach 4.5 million tons by 1975. [3]

The price of aluminum, based on a GDP deflator setting the year 2000 at 100, dropped from about $6,000 per ton in 1925 to about $2,000 at the end of World War II before climbing back up to about $2,700 in the late 1950s and dropping with hills and valleys to about $1,500 in the early 1970s. Overall, the price decline from 1945 to 1972 was about 2% per year. Prices began to climb in the 1970s as a result of energy shocks in 1973 and 1979 and the surge of energy demand in China, India and Brazil. This energy demand did not drive up the cost of electricity the same way in all nations. Some nations benefited from low-cost hydroelectricity or coal, which kept electricity prices lower. Eventually primary aluminum production shifted from high-cost locations like Japan, the U.S. and Western Europe to lower-cost areas like Australia, Canada, Middle East, Russia and China. Other factors that affected aluminum prices included public policies, taxes, exchange rates, trade tariffs and subsidies, according to Carmine Nappi's 2013 account. By the 1990s, another new factor affecting aluminum prices was the increasing trade in aluminum as a commodity in index funds, hedge funds and "proprietary trading desks," where commodity traders had their own warehouses to store inventory. [4]

Prior to 1980, the U.S. aluminum industry dominated the world aluminum market with more than 40% of the global smelter capacity. By 1987, that position had changed. Aluminum imports from Canada doubled during the first half of the 1980s, and nearly 20% of U.S. aluminum capacity was permanently closed between 1978 and 1987. Three economic factors caused this change – higher energy prices, weak market demand, and the strong U.S. dollar. During the 1970s rapidly rising energy costs, often connected with oil prices, drove up the cost of power to U.S. aluminum plants. One effect was that construction of additional U.S. capacity was deferred and in some cases redirected to Canada, Australia and Brazil. No new aluminum smelting capacity was built in the U.S. between 1980 and 1987. In the Pacific Northwest, power rates rose from $2.50 per megawatt-hour in 1978 to $25 by 1984, a 1,000% increase largely attributed to cost over-runs at nuclear power plants, some of which were never built. [5]

In southeastern U.S., the price of power from the Tennessee Valley Authority increased from $20 per megawatt-hour in 1978 to more than $37 by 1984, but because of take-or-pay clauses, power for some

plants increased to about $88 by 1984. Along the Gulf Coast of the U.S., where cheap natural gas in 1983 made average rates lower than in the Pacific Northwest, rising natural gas prices forced prices up to $40 per megawatt-hour, and four out of five smelters in that region permanently closed by 1987. In the Ohio River Valley, aluminum smelters using coal-fired power fared much better, with power rates ranging from $18 to $30. While energy prices increased as a result of the energy crisis in the 1970s, world demand for aluminum fell 12% between 1980 and 1983, partially a result of market saturation in certain high-growth consumer uses, such as beverage containers, and from increasing competition with other materials, such as vinyl siding, according to Jim Corr's 1987 master's thesis at the University of Montana. At the same time, aluminum smelting capacity continued to increase outside the U.S., including in Canada. As a result, only the most cost-efficient aluminum smelters could continue to make money. A third economic factor was a strong U.S. dollar – the Canadian dollar gained 27% over the U.S. dollar from January 1978 to March 1986. An analyst argued in 1987 that the strong U.S. dollar was the most important factor in undermining the dominant position of the U.S. aluminum industry. [6]

Prior to World War II, the global aluminum industry was dominated by Alcoa and Pechiney, as the advantages of economies of scale favored large vertically-integrated companies. After World War II, six large vertically-integrated companies grew to control the industry – Alcoa, Kaiser, Reynolds, Alcan, Alusuisse and Pechiney. By the early 1950s, they accounted for about 85% of aluminum capacity in the non-Communist world. By 1974, that figure had dropped to 68%, and by 1980 it had dropped to 45%. [7] Between World War II and the early 1970s, the Big 6 aluminum companies attained a high degree of concentration and vertical integration and operated as an oligopoly. Although they were predominantly smelters and fabricators, they also owned or controlled most of the world's bauxite and alumina production. The Big 6 accounted for about 65% to 85% of the aluminum produced between World War II and the early 1970s. Their market size allowed them to set prices at cost plus a margin of profits, which became known as "producer prices," according to the Congressional Office of Technology Assessment. The prices remained relatively stable because the companies were able to meet changes in

demand by adjusting inventories and production rates, and by building new capacity in anticipation of new demand. The result was “planned excess capacity,” which not only helped the companies adjust to changing demand but set a high bar for companies that wanted to enter the industry. The Big 6 also sold their excess bauxite and alumina to preferred buyers, thereby enabling them to determine their competition. The Big 6 used the same strategy that helped Alcoa early in the 20th century – control of natural resources, high barriers to entry and access to low-cost energy. [8]

Changes in the world aluminum industry began to appear in the early 1970s with the International Bauxite Association countries taking control of 70% of the world’s bauxite-producing mines, and in 1978 with the appearance of the aluminum futures market on the London Metal Exchange. The traditional role of the Big 6 as the source of international prices eroded by 1980 as independent and state-owned aluminum companies and independent aluminum merchants captured a larger share of the overall market, according to Rhea Berk, Howard Lax, William Prast and Jack Scott’s 1982 account. Soon after World War II ended, both Brazil and India became producers of primary aluminum, and shortly after 1950, Australia and French Cameroon also became primary aluminum producers. The 1970s were a difficult period for all industries, with cyclical economic fluctuations, repetitive oil price hikes and shortages, and the emergence of resource nationalism – the demand by countries to maximize the benefits of its natural resources by controlling their development. [9] By the early 1970s, electricity, labor and capital costs rose significantly, while demand slowed. As profit margins shrank, the aluminum producers turned to other strategies. With the London Metal Exchange setting prices in the late 1970s, the Big 6 no longer worked together as a cohesive group – some sought to maintain prices by reducing production, while others turned to building new capacity in low-cost foreign locations. Both strategies proved to be unsuccessful. [10] By 1980, the Big 6 aluminum companies operated and partially or wholly owned approximately 40% of the world’s bauxite production, 50% of the world’s alumina production and 45% of the world’s primary aluminum production. [11]

Northwest power problems

Power shortages in the Pacific Northwest in the 1950s had caused outages to aluminum smelters, created political hurdles for the Harvey Machine Co.'s plans for an aluminum plant in the Flathead Valley of Montana, and forced Kaiser to shift plans for a new aluminum smelter south to Louisiana. But power shortages as a result of drought or increasing demand only grew worse. By the late 1960s, BPA forecasts for electrical demand in the Pacific Northwest suggested the federal power system would not be able to meet growing electrical requirements. With most of the Columbia River's hydroelectric potential sewed up, the BPA began to look at supplementing hydroelectric power with thermal sources, including oil and nuclear. The result was the development of the Hydro-Thermal Power Program in the mid-1960s. [12]

On Aug. 20, 1969, low water flows in the Columbia River forced the BPA to curtail electrical power by 35% to its industrial customers, including the Anaconda Aluminum Co. plant in Columbia Falls. To replace the power, the BPA began to purchase outside power at the rate of $10,000 more per day. The BPA intended to purchase 80 megawatts from the Montana Power Co. and 125 megawatts from the British Columbia Hydro and Power Authority. The curtailment affected 18 large electro-processing plants, mostly aluminum producers. Water flow at Grand Coulee Dam had not been so low in 12 years. Because of the low water levels, the BPA began to sell provisional power to heavy industries – if stream flows remained low, the industries would have to replace the missing energy or pay for it in cash. By mid-August 1969, about 25% of the power provided by the BPA to heavy industries was provisional. At the Hungry Horse Reservoir in Montana, the water level was eight feet below the full mark, the first major summer draw-down since the dam was completed in 1952. [13] AAC began purchasing higher-priced electrical power from outside sources right after the BPA's Aug. 20, 1969 announcement. The power would be transmitted to the plant over BPA lines. In the past, the plant had purchased additional power from the Montana Power Co. [14]

In 1970, the BPA published an economic base-study for power markets in the Pacific Northwest. While acknowledging that high freight costs were a significant disadvantage to the region's aluminum producers,

the BPA believed the industry could prosper in the future. The BPA forecast worldwide aluminum demand would grow by 6% to 8% per year over the next 10 years, and U.S. demand would grow by 7.4% per year over the next five years. The regional aluminum industry's continued growth depended on four factors: 1) that the BPA's firm power rate stayed close to $2.10 per megawatt-hour; 2) that additional power generation with comparable rates was made available; 3) that power rates in the Pacific Northwest remained at least $1.50 per megawatt-hour below other regions; and 4) that promotional efforts were made to help the aluminum industry, including supporting construction of deep-water ports for ocean-shipping of raw materials. If these four factors were met, then the BPA forecast the regional aluminum industry would grow from 797,000 tons of capacity in 1965 to 3.8 million tons by 1985. The BPA, however, believed the forecast was unlikely because conditions in 1970 indicated the region's power price advantages would probably diminish. [15]

The BPA was obligated to repay the federal government for the cost of building and maintaining its power system's facilities. The aluminum industry made significant contributions to the amortization of the BPA system from the very beginning by utilizing the system's surplus hydroelectric power. Because of economies of scale, it was cheaper to transmit electrical power to aluminum plants than to residential and commercial customers. Aluminum plants took power at high voltages at a constant level to a single delivery point. Over the decades, the industry also helped to reduce the cost of firm power with its willingness to purchase nonfirm power, which helped the region's electrical system perform more efficiently. By the 1970s, aluminum plants purchased 25% of their power on an interruptible basis and another 25% on a nonfirm basis, which created reserves for the region's power system. These reserves could be used to account for delays in construction of new power plants as well as for traditional variability of available water. The reserves could also be used for normal operations. To prevent a regional blackout, the BPA could cut off power to aluminum producers for as long as five minutes. In the case of forced outages and peaking capacity reserves, the BPA could cut off power to aluminum producers for up to two hours. The BPA was also allowed to sell surplus power outside the Pacific Northwest. Surplus power was defined by statute as energy for which there was no

demand within the region and was generated by water which otherwise would have spilled over the dams during periods of high stream flow. [16]

In August 1970, AAC General Manager Charles Taylor compared recent electrical power shortages on the East Coast to possible shortages in the Pacific Northwest. About 75 megawatts of BPA power supplied to the smelter in Columbia Falls was considered interruptible power – about the same amount consumed by one of the plant's five potlines. Should a shortage occur, this power could be cut to AAC and used by other BPA customers. Taylor acknowledged that the BPA's 1971 fiscal report forecast power shortages for the next five years in the Pacific Northwest. On the bright side, the Libby Dam in Northwest Montana was expected to come on line in 1973, he noted. [17] In early December 1972, extreme cold weather caused heavy power demands on the BPA resulting in a cutback in interruptible power throughout the Pacific Northwest. Statistical averages showed that an additional 100 megawatts of power were needed for every one degree drop in temperature during cold seasons in the Pacific Northwest. The AAC plant experienced a 20% power cut on four different days. The plant normally required 372 megawatts of power, of which 45% was supplied by the BPA as interruptible power. [18]

In April 1973, AAC curtailed production at the Columbia Falls smelter to 74% of capacity and laid off 114 workers as a result of power cutbacks by the BPA. The cutbacks resulted from low rainfall, which averaged 51% of normal for the first seven months of 1973. By fall 1973, the rain returned with one of the wettest Novembers on record. Cloud seeding was a major topic throughout the year. [19] Power problems began on April 3 when the BPA cut interruptible power to all heavy industries in the Pacific Northwest from 9 to 11 a.m. and from 4 to 10 p.m. due to below normal snowpack and water reserves. The cutback amounted to a 20% curtailment at the AAC plant, which went into a holding pattern and did not immediately lay off any workers. AAC was purchasing additional power from British Columbia at the time. [20] By April 11, the 20% power curtailment had resulted in 54 layoffs. Previous historical curtailments at the plant had occurred in 1957, 1958 and on Jan. 15 and Feb. 15, 1971 – each the result of market conditions and not power shortages. The power curtailment coincided with a difficult time

when aluminum prices were low. The power reduction was blamed on low snowpack and water reserves, the driest winter and spring in the Flathead since the 1940s. About 50% of all interruptible power available to heavy industries in the Pacific Northwest, primarily aluminum producers, was impacted. Most aluminum producers in the Pacific Northwest took 75% of their power in firm or guaranteed power and about 25% in interruptible power sold at a lower price. BPA officials predicted the cut back could last a whole month. [21] On April 13, the rod mill at Columbia Falls shut down because of the BPA cutback. Fifteen of the 69 workers laid off as a result of the power cutback were from the rod mill. [22]

By April 20, 1973, employment at the AAC plant had fallen to 841 workers from 910 earlier in April. Production at the plant was down by 20%. According to plant officials, if moisture did not increase or if AAC could not purchase more power elsewhere, there was a chance the smelter would reduce production by another 20%. [23] By Aug. 10, employment was at 856 workers and the smelter was operating at 74% of capacity. Production dropped 6% in the first week of August as continuing water shortages forced the BPA to cut back power. [24] By October, water flow in the Columbia River was a little more than half of normal and water stored for electrical generation was about two-thirds of normal. The BPA and other utilities urged residential, commercial and industrial customers to reduce their demand by 7.5% immediately to prevent a mandatory 25% cutback in early 1974. A coordinating committee of 21 Pacific Northwest utility representatives recommended that state officials be empowered to require a 10% cutback of all power use in November. The BPA reported that its power system would be 14 million megawatt-hours short of its normal 41 million megawatt-hour supply over the next 20 months. [25]

On Dec. 5, 1973, BPA Administrator Donald Hodel announced that it was “entirely probable” that mandatory cutbacks in power would be reimposed “very shortly” in order to make power generated in the Pacific Northwest available to regions that relied on oil for electrical generation. Heavy rainfall and conservation efforts by Pacific Northwest consumers had significantly reduced the need for power curtailments that had hurt the region all year. A utility spokesman confirmed the announcement by stating that the Defense Power

Agency could order a mandatory 10% cutback in the Pacific Northwest in order to help other regions. [26] In late December, with increased rainfall and an improved power situation, the AAC plant was able to restart one-half of its single idled potline and rehire 21 workers. [27] Smelter workers began warming up reduction pots in Potroom 3 on Jan. 2, 1974. [28] Two weeks later, after learning from the BPA that full power would soon be restored, AAC announced plans to return the plant to 100% capacity by Feb. 15. According to the BPA, heavy rains and snowfall in December 1973 had created a power surplus and the BPA was selling power to California. [29] The last of AAC's idled reduction pots were restarted on Feb. 1, and the plant slowly returned to 100% capacity. The company had received BPA approval to move up the schedule from Feb. 15 to Feb. 1. [30]

First BPA rate increases

Shortages of aluminum occurred in the U.S. markets in 1972 through 1974. A survey by the Senate Government Operations Committee found that 74% of U.S. aluminum fabricating companies indicated they had aluminum supply problems, including sheet, plate, rod, bar, tube, extrusions, castings, foil, forgings and others. The main cause was believed to be increasing demand with static supply, but the power shortage in the Pacific Northwest in 1973 was also considered a factor. Other impacts included shortages of scrap and alumina imports due to high prices, insufficient rolling mill capacity for foil, environmental compliance costs, and the Nixon administration's price-control measures. Independent fabricators and smaller customers were hit the hardest. The aluminum shortages continued in 1975 to 1977. The shortage in 1975 began when the U.S. construction industry slowed down and use of aluminum slowed with it. U.S. aluminum companies reduced production in response, but the General Services Administration also released 7,500 tons of aluminum from the government stockpile. U.S. aluminum demand increased in late 1975 and early 1976 as construction picked up and the Ford Motor Co. opted to increase production. The tight supply was eased somewhat by aluminum can recycling during 1976. [31]

Market shortages typically drive up prices. In the case of the BPA, rate increases in the 1970s and 1980s were caused by a number of factors other than shortages. The BPA's first rate increase in history was

approved in 1965 by the Federal Power Commission. The rate increase averaged 3% and took effect on Dec. 20, 1965. [32] Over the next three years, AAC expanded the smelter in Columbia Falls from three potlines to five. On Sept. 14, 1967, the BPA announced it had signed a 20-year power supply contract with AAC. With two more potlines, the BPA needed to arrange for increased power deliveries. The contract provided 80 megawatts of additional modified firm power at a cost of $1.4 million per year. The company agreed to take about 25% of its electricity as interruptible power after 1973. The company received assistance from both Sens. Mike Mansfield and Lee Metcalf in getting the contract through the U.S. Senate. [33] In mid-December 1972, Hodel announced that the BPA would seek approval for a 25% rate increase by December 1974, possibly followed by a second rate increase in 1979. An AAC spokesman called the proposed rate increases "deplorable." [34]

The BPA followed through on Dec. 20, 1974, by increasing wholesale power rates by an average of 27% – the second rate increase since the agency began selling power in 1937. The BPA forecast imminent rate increases as a result of increasing costs, and contracts were renegotiated with its customers allowing for more frequent rate adjustments. In 1978, the BPA suggested that rates could possibly increase in December 1979 or July 1980 and then each July thereafter. [35] By 1974, industry used 53% of the power consumed in the Pacific Northwest. This included aluminum plants, paper mills, lumber mills, crop irrigation, chemical plants, nonferrous metals plants, food processing plants, ferrous metals plants and other industries. The BPA forecast industrial use would increase two and a half times by 1995. Of the 53% used by industry, aluminum plants accounted for 49.4%, meaning aluminum plants consumed about a quarter of all power in the region. The aluminum plants in the Pacific Northwest accounted for about 32% of total U.S. aluminum production capacity. About 90% of the power used by the region's aluminum plants was supplied by the BPA. [36]

The U.S. aluminum industry embarked on an energy-saving program in 1974 with the goal of reducing energy consumption by 10% by 1980, using the year 1972 as a base year. The industry achieved its goal by 1978, two years early, and set a goal of reducing energy consumption

by 10% more by 1985. The most significant improvement came from better “housekeeping” or energy-management measures, as well as certain equipment modifications. Housekeeping measures included shutting down standby furnaces, eliminating steam and heat leaks, and lowering potline temperatures when possible. Some capital investment was required to reduce energy losses in anode and cathode electrical connections. [37]

The BPA also underwent internal rule changes during this period. In August 1972, the U.S. Treasury issued new regulations governing industrial bonds under the Revenue and Expenditure Control Act of 1968. The new ruling changed the tax-exempt status of the BPA, resulting in higher bond costs for federal loans used to build federal hydroelectric dams and plants throughout the region. This in turn led to higher rates for electrical power. On Oct. 18, 1974, President Gerald Ford signed the Columbia River Transmission System Act, making the BPA a self-financing organization. The Act evolved from changes the BPA undertook as early as 1973 when it joined with power utilities to extend the Hydro-Thermal Power Program plan to encompass the energy needs of the entire Pacific Northwest. [38]

Until the new Act was passed, the BPA was forced to go through the Congressional appropriation process every year, a situation made more complicated by competing budgetary interests that interfered with the BPA’s ability to undertake long-range planning and construction of transmission facilities. Under the new Act, the BPA’s annual budgets and major projects continued to be reviewed for approval by the Office of Management and Budget and the Congress. The BPA was also required to maintain its statutory requirements to repay the U.S. Treasury for any power-related investments in federal hydroelectric projects. [39] Previously, the BPA deposited all its receipts in the U.S. Treasury and then obtained appropriations from Congress for construction, operation and maintenance. The new law directed the BPA to finance its operations and maintenance from its revenues. [40] The Act also established basic principles for rates set by the BPA – power rates should be fixed and created to encourage the widest possible diversified use at the lowest possible rates to consumers consistent with sound business practices. The rates should also

attempt to recover the costs of generating and transmitting power and to pay for any debt the BPA incurred. [41]

The June 1976 notice

The BPA stopped up its forecasts for electrical shortages for the Pacific Northwest in the mid-1970s as growth in the region increased demand for electrical power. The BPA notified aluminum producers that when their contracts expired in the 1980s, they might not get any more power from the BPA. [42] Much of the direct-service industry (DSI) power in the BPA system could be interrupted to ensure continuous flow of power to BPA's firm power customers whenever conditions required it. Between 1978 and 1986, the BPA made four long-term interruptions to first-quartile sales to DSI customers for a total of 34 months in order to continue service to other customers. The BPA could also interrupt second-quartile sales to DSI customers for up to 15 minutes to alleviate short-term power outages, or up to 50% for two hours each day during peak hours to serve other customers. In most cases, the BPA was able to give DSI customers advance notice of these short-term interruptions. Power interruptions to aluminum smelters could cause reduction pots to cool and even freeze. Restarting an idled potline could take three months and cost more than $1 million. Short-term interruptions occurred on an irregular basis. [43] On March 17, 1976, the BPA announced that it intended to give notice that it would be unable to supply sufficient power after July 1, 1983, to meet load growth by its preference customers. After that date, the BPA's obligation to deliver firm power would be limited to power allocation computed according to contract provisions and service needs for new preference customers. [44]

In April 1976, Ron Wilkerson, the BPA district manager in Kalispell, spoke to the Hungry Horse News about future electrical shortages in the Pacific Northwest. The BPA forecast that under low water conditions, an electrical deficit of 12% could exist for four years beginning in 1978-1979. A wet winter could delay the crisis, but additional electrical power generated by the new Libby Dam had already been taken into account. No more major undeveloped hydroelectric sites existed, Wilkerson pointed out, leaving only three choices – reduce consumption, build coal-fired generating plants, or build nuclear-powered generating plants. Wilkerson said he hoped the

June 1976 announcement about the BPA's inability to meet electrical load growth would force utilities to begin looking elsewhere for power, but it was expected that utilities instead would file claims for power used by large industries, such as aluminum smelters. The BPA was the selling agent for the electricity produced at 29 federal hydroelectric dams on the Columbia River system. Its customers included seven aluminum smelters with 12,000 people directly employed and another 123,000 indirectly employed in fabricating, selling and servicing the aluminum industry. [45]

In the official June 1976 notice, the BPA said it could not renew electrical contracts with aluminum plants in the Pacific Northwest once the existing contracts expired in 1984 through 1988 because of increasing demand. Pacific Northwest utility companies wanted to replace aluminum industry customers with higher-paying residential and commercial customers. A possible solution to the BPA's concern was either a lowering of demand by non-aluminum sectors or the development of additional power sources. [46] The BPA told customers that beginning in 1980, electrical production would be short of demand and customers would need to consider curtailing load and rates would have to be raised. [47] The BPA said its preference customers – public utilities, electrical cooperatives and municipal utilities – would continue to receive their share of cheap hydropower, but investor-owned utilities (IOUs) would only be able to purchase nonfirm power. This was the first time in the history of the BPA that the preference clause had real meaning, as IOUs were being denied firm power. In response to this warning, the IOUs began to build thermal power plants that required higher power rates to finance. At the same time, the BPA told its direct-service industry customers that they would continue to receive power until their contracts expired in the early 1980s. The IOUs protested what they perceived to be unfair treatment by the BPA, according to Peter Cooper's 1986 account. The City of Portland filed a lawsuit against the BPA, and IOUs across Oregon formed public-utility districts in order to qualify for preference power. The result of all this political fighting was the passage by Congress of the Pacific Northwest Power Planning and Conservation Act in 1980. [48]

In June 1974, the Arthur D. Little Co. conducted a study of the economic and fiscal impacts of the Pacific Northwest aluminum

industry in relation to electrical power. Funded by Alumax, Alcoa, Anaconda, Intalco, Kaiser, Martin Marietta and Reynolds, the study was continued in 1977 in order to show the importance of the region's aluminum industry in response to talk about energy deficits and possible cutbacks in electrical power to the industry. The 10 aluminum plants in the region produced 1.92 million tons of aluminum in 1976 despite a rated capacity of 1.6 million tons per year. The cost of making aluminum in the Pacific Northwest had increased substantially between 1966 and 1977, with salaries and wages up 73.7%, freight payments up 38.9%, electrical power up 33.8%, materials and supplies up 39.7%, and payments to state and local taxes up 46.5%. [49]

According to the Arthur D. Little study, transportation costs to and from the Pacific Northwest aluminum industry were historically high – in 1977, the regional industry spent more than $99 million on freight costs compared to $82 million on electrical power. Between 1973 and 1977, the regional industry as a whole increased aluminum output by 41.1% with no significant increases in the size of the workforce and with a 30% increase in electrical power payments. Between 1966 and 1977, the workforce increased by about 12%. By 1977, the regional aluminum industry employed 11,439 workers, with derivative employment reaching 29,741 workers. The regional average wage of aluminum workers in 1977, excluding benefits, was about $21,360 per year. Salaries and wages paid to the regional industry in 1977 totaled about $244.3 million, providing a disposable income to aluminum company employees of about $208 million. Direct and indirect employment taken together for 1977 totaled about $570 million. The Pacific Northwest aluminum industry also spent about $131 million on pollution abatement measures between 1973 and 1976. [50]

Arthur D. Little Co. reported that about one-third of all BPA energy sales went to the regional aluminum industry, noting that the dollar amount reflected a rate increase put into effect on Dec. 20, 1974. When total BPA energy sales were combined with non-federal electrical power, about 22% was sold to the region's aluminum industry. The lower figure showed that as energy demand increased across the region, particularly in the rapidly increasing residential sector, energy demand by the aluminum industry remained relatively constant. Despite this stable demand, the aluminum industry was being asked to

pay a substantially higher share of the energy cost, the study noted. In addition to economic benefits, the Pacific Northwest's aluminum industry helped make the region's electrical system perform more efficiently, the Little report said. Aluminum plants purchased 25% of their power on an interruptible basis and another 25% on a nonfirm basis, which created reserves for the region's power system that could be used to account for delays in construction of new power plants and variability of available water. The reserves could also be used for normal operations – to prevent a regional blackout, the BPA could cut off power to aluminum producers for as long as five minutes. In the case of forced outages and peaking capacity reserves, the BPA could cut off power to aluminum producers for up to two hours, the Little report noted. [51]

In July 1976, Skidmore, Owings & Merrill completed an electrical power conservation study for the BPA with the hope of reducing forecast power needs for 1980 and 1995. The study came up with five categories of improvement measures that could possibly increase efficiency and reduce waste in the Pacific Northwest's 10 aluminum plants. The gain from better use of heating and lighting, categorized as "housekeeping" improvements, would be small. Some improvement was possible by installing solid state rectifiers at three of the 10 plants at a cost of $5.64 million. Improvement of process control through the use of computers at nine of the 10 plants would conserve power at a total cost of $13 million. Modifying the operation of reduction pots had reduced power use by some aluminum companies with no capital investment. These modifications included "tighter control of the depth of the molten aluminum pad, distance between anode and cathode, and fractions of cryolite and alumina in the bath." Lastly, power factor – energy losses caused by the use of large motors – could be improved for all 10 plants at a cost of $2 million. [52]

Taken altogether, aluminum producers agreed that the measures reported by Skidmore, Owings & Merrill could reduce the number of kilowatt-hours needed per pound of aluminum produced by 3% by 1980. Looking further to the future, the study pointed out that two alternatives to the Hall aluminum reduction process were under development. Alcoa's use of chlorine rather than fluorine as an electrolyte at its experimental pilot plant in Palestine, Texas, was

reported to consume 30% less electricity. The Toth process, under development by the Applied Aluminum Research Corporation in New Orleans, utilized coal in the aluminum reduction process instead of electrolysis and overall reportedly consumed 90% less electricity. The conservation study also called for increased use of recycled materials – refining waste aluminum required only 5% of the power consumed in the commonly used Hall-Heroult reduction process. The study noted, however, that increasing use of recycled aluminum was energy efficient for the industry as a whole but not for the aluminum smelters in the Pacific Northwest. [53]

The 1976 drought

With the power situation already uncertain, the worst fall and winter drought in the history of the Pacific Northwest began in September 1976. Stream flows for October 1976 through July 1977 were the lowest on record. By May 1, 1977, snowpack in the Columbia Basin was the lowest on record for that date and 36% below normal. Precipitation and snowpack levels were so low that the BPA was forced to discontinue nonfirm energy deliveries to its industrial customers, including aluminum producers, beginning Nov. 1, 1976. The region's direct-service industries reduced electrical consumption by about 68% from November 1976 through July 1977. Ironically, August 1976 was the wettest on record. [54] Beginning Feb. 15, 1977, the BPA terminated interruptible power to the AAC plant in Columbia Falls, which accounted for 25% of the smelter's power. To make up for the difference, AAC arranged to receive power through the BPA from Canada for the rest of February. Efforts were underway to continue receiving Canadian power through the spring to avoid a large reduction in the plant's operating capacity. [55]

On Feb. 17, 1977, AAC shut down all of its reduction pots in Potroom 2, accounting for 10% of the plant's capacity, and 20 workers were laid off. The power from Canada was not enough to make up the 25% cutback by the BPA. Aluminum plants across the Pacific Northwest were experiencing similar difficulties. Kaiser Aluminum closed two potlines at its Mead smelter in Spokane, and both Alcoa and Reynolds announced cutbacks. The cutback at the AAC plant forced the rod mill to shut down in mid-March despite a high demand for rolled aluminum. [56] Power was brought back to 100% on Jan. 25, 1978, after adequate

snow fell to ensure sufficient water supplies to federal hydropower reservoirs. At the same time, AAC's aluminum smelter in Sebree, Ky., was facing power shortages from coal-fired power plants as a United Mine Workers strike curtailed coal production. [57] In fiscal year 1977, the BPA sold 61.7 million megawatt-hours of power. About 54.3% of that power went to publicly-owned utilities, 36% went to the Pacific Northwest aluminum industry, 5.2% went to privately-owned utilities, 3.4% went to other industries, and 1.1% went to government agencies. In the industrial sector, 17 companies operating 24 plants purchased $94.2 million of power from the BPA, and in turn paid an estimated $271.6 million in wages and salaries to 13,510 workers, as well as provided employment for an estimated 30,000 indirect workers. [58]

At a press briefing in Kalispell on Sept. 13, 1977, Ron Wilkerson stated that a national energy crunch was a threat to future operations by major electrical power consumers like the aluminum plant in Columbia Falls. The BPA had officially announced that once AAC's contract with the BPA expired in 1987, there was no guarantee it would be renewed. In Portland, Don Hodel stated that a major overhaul of the power system in the Pacific Northwest was under discussion. A five-volume draft environmental impact statement on electrical use in the Pacific Northwest had been completed after two years. [59] The power problem provided the basis of a tax appeal by AAC one month later. AAC lawyers argued for a reduction in appraisals for company property during a hearing in Columbia Falls before the Montana State Tax Appeal Board in mid-October. The state Revenue Department valuation for the AAC plant had more than doubled from 1975 to 1976, from $15.1 million to $32.5 million. The increase was upheld by the Flathead County Appeal Board, but a partial decrease resulted after AAC appealed to the state. [60]

Arguing the tax appeal for AAC was Great Falls attorney Morris Ormseth, who pointed to the uncertainty of the aluminum plant's future in light of unreliable electrical power supplies. The uncertainty of power supplies had reached the point where it had become a "factor of economic obsolescence," he said. The plant had seen significant reductions in output twice in the past five years as a result of BPA power cutbacks despite a strong demand for aluminum in the market, Ormseth said. AAC Assistant Manager Charles Taylor pointed out that

the aluminum plant was built in the Flathead Valley because of cheap electricity from Hungry Horse Dam despite the higher freight costs, while aluminum plants in New York, the Midwest and Louisiana had higher power costs and lower freight costs. Taylor pointed to the possibility of an inflationary spiral and worried about higher power costs becoming more permanent. He noted that 75% of AAC's power came with a firm contract from the BPA, but the remaining 25% was interruptible power. He also noted that historically, large industrial power consumers helped to pay for the cheap hydroelectricity that had become available to commercial businesses and homes. [61]

The BPA announced on Jan. 10, 1978, that it would resume supplying interruptible power to the 10 aluminum smelter plants in the Pacific Northwest. Rain had returned to the region after 14 months of drought. The cutback was the longest since the BPA began operating in the 1930s. About one-third of U.S. aluminum production was located in the Pacific Northwest, and with power restored production would increase by 260,000 tons per year within the next two months, creating 600 jobs. The increase in production would come at a time when demand was also rising and aluminum supplies were tightening. Overall, U.S. aluminum producers were operating at 87% of capacity, but companies in the Pacific Northwest wanted to run their plants at 100% to take advantage of cheaper power while it lasted. Alcoa, Reynolds and Kaiser announced plans to restart potlines, but restarting potlines could cost from $300,000 to $500,000. Some companies opted to purchase power outside the BPA system – Intalco's smelter in Ferndale, Wash., turned to power from British Columbia that cost three to seven times as much. Growth in demand by both industry and municipalities in the Pacific Northwest had strained the BPA power system, and the BPA warned aluminum producers that it might not be able to supply them power after 1983. A compromise bill was before Congress that proposed construction of new non-hydropower plants to supplant the existing BPA system, but residents opposed the plan because it would raise rates. Opponents also noted that the aluminum industry consumed about one-third of the power produced by the BPA. [62]

A large rate increase in 1979 significantly changed the Pacific Northwest power picture. Soon after the rates went up in 1979, the market price of aluminum also fell, and aluminum smelters cut

production and purchased less power from the BPA. By March 1983, BPA power purchases by Pacific Northwest aluminum plants fell from about a third of the BPA total to about 8%. The result was a power surplus and a drop in BPA revenues by as much as $100 million. The BPA encouraged aluminum plants to restart potlines by temporarily offering reduced power rates. [63] AAC was notified by the BPA on May 22, 1979, that its base rate for electrical power would increase by 90% effective Dec. 20. The rate hike was not a total surprise to AAC officials – they had been warned by the BPA in 1978 that the rate might increase by 40%, but it went up by 90% because of problems with the bond financing for three nuclear power plants in Washington. [64] The big rate hike was accompanied by another round of power supply problems blamed on a shortage of reservoir water at hydroelectric dams. In the last days of 1979, Kaiser Aluminum shut down one of the eight potlines at its Mead smelter. AAC continued to operate all five potlines at its Columbia Falls smelter because it had purchased power from outside the BPA system that insured power would be available in event of a bad year, but the plant was operating at reduced capacity as it changed over to the new Sumitomo reduction pot technology and required less power. [65]

Regional power planning

With demand threatening supply, some analysts saw regional power planning as what the Pacific Northwest needed. The Bonneville Project Act, signed by President Roosevelt on Aug. 20, 1937, had created the Bonneville Power Administration and was in effect the first regional power plan. The Army Corps of Engineers 308 Report in 1927 had recommended construction of 10 major hydropower plants along the main stem of the Columbia River starting at Bonneville, 146 river miles upstream from the mouth, and ending at Grand Coulee, 597 river miles from the mouth. [66] The Army Corps of Engineers issued an updated 308 Report in 1958 that described three theoretical phases of power development in the Pacific Northwest. In stage one, all of the economically justified hydropower sites would be developed by about 1975. During the second stage, additional energy requirements would be met by adding thermal generating plants – using coal, oil or nuclear energy. The third stage was referred to as the “Mature Stage,” by which time all the thermal plants would be completely amalgamated

into the regional generating system, and continued load growth would be met with the construction of one new thermal plant per year on average. [67]

By Jan. 1, 1978, the rated electrical generating capacity of the Pacific Northwest totaled nearly 37,000 megawatts, of which 79% was from hydropower. Of the 31,000 megawatts of hydropower, 14,250 megawatts was generated by federal dams and was marketed by the BPA. About 6,500 megawatts of the total capacity came from non-federal thermal generating plants, of which 80% came from five large generating plants – the coal-fired plant in Centralia, Wash.; the dual-purpose nuclear reactor at Hanford, Wash.; the Jim Bridger Units 1, 2 and 3 coal-fired plants at Rock Springs, Wyo., with two-thirds of the power going to the Pacific Northwest; the Colstrip Units 1 and 2 in Montana, of which half went to the Pacific Northwest; and the Trojan nuclear plant north of Portland, Ore. The prospect of new large hydropower plants being built in the Pacific Northwest was not considered likely. [68]

One of the many regional power planning efforts over the decades was the Pacific Northwest Utilities Conference Committee. PNUCC grew out of a voluntary power planning effort in 1942 called the Northwest Power Pool that set out to increase efficiency and cooperation among utilities in the region. After World War II ended, the BPA sponsored a conference in Tacoma to further that effort, which led to the formation of PNUCC, which included representatives from the BPA, public and private utilities, and direct-service industries like the aluminum companies. PNUCC often served as a place for the BPA to announce policies and for the BPA to hear customer views on these policies. [69] PNUCC was officially formed in 1950 under the Defense Electric Production Act by order of the Secretary of the Interior. The order required that 10-year forecasts be made periodically. [70]

By summer 1977, a regional energy plan for the Pacific Northwest was being developed in Congress out of fear of another energy shortage like the one caused by drought in 1973. PNUCC drafted a bill to present to Congress, but environmental groups were soon lobbying against it, claiming the PNUCC bill was made in secret. The bill would authorize the BPA to purchase power from existing resources, including thermal plants, and then sell the power to public and private utilities. The BPA

would not be required to purchase power, and there could be long-term impacts if it did so. The BPA would be advised by a regional power planning organization. The agency would also distribute hydropower benefits among the Pacific Northwest utilities, spend $300 million on conservation programs, and direct the states to improve building codes for energy conservation. Overall, energy costs were expected to increase, particularly for aluminum plants. According to an editorial in the Seattle Times, if the bill failed, “among the likely results (will be) consequent economic dislocations, including the loss of thousands of jobs in the region’s electro-process industries.” [71]

The Sept. 9, 1977, issue of “Anaconda Today,” the company newspaper, reported on electrical shortages impacting Pacific Northwest industries and described PNUCC’s work to pool conservation efforts and power capacity among industries. The resulting power for heavy industries was expected to cost three times the 1977 rate. The PNUCC plan, proposed by Sen. Henry Jackson of Washington, would amend the Bonneville Power Act and would authorize the BPA to purchase power from any available or future sources. [72] The overall problem facing the region was that hydroelectric potential for the Columbia River and its tributaries had been fully developed, but demand for power continued to grow. The BPA had published projections indicating a probable energy deficit through 1987 to 1988, especially if a drought occurred. Investor-owned utilities went so far as to forecast the need for 26 new coal-fired or nuclear power plants by 1995 to meet basic load requirements. Total power consumption in the Pacific Northwest had increased about 12% from 87.7 million megawatt-hours in 1970 to 104.2 million megawatt-hours in 1975. Most of the growth was in domestic consumption, which rose about 30% to 36 million megawatt-hours, and commercial consumption, which rose about 36% to 16.4 million megawatt-hours. In contrast, industrial consumption remained relatively constant, increasing less than 5% to 46.1 million megawatt-hours. [73]

In addition to an energy deficit, the region’s power supply system was experiencing a transition from predominantly hydropower sources to a mix of hydropower and thermal, including oil or nuclear. One result of this mix was a growing rate disparity, where consumers in one area paid significantly higher rates to private utilities while consumers in a

nearby area paid significantly lower rates to BPA-supplied utilities. One frequently cited example of rate disparity was in Vancouver, Wash., where BPA-supplied power was about one-half the cost of investor-owned utility power across the Columbia River in Portland. The PNUCC proposal emerged from negotiations between investor-owned utilities, public utility districts and private industry, the latter mostly consisting of aluminum producers. The aluminum industry traditionally faced public and political criticism for its substantial consumption of federally funded power. The basic strategy of the PNUCC proposal was a broad-based sharing of available power along with an increase in cost to public utilities. [74]

The aluminum industry supported the PNUCC proposal, fearing that if energy costs continued to increase then low-cost power in the form of nonfirm and interruptible power might no longer be available. In that case, most of the plants might have to consider major curtailments and layoffs, or even shutting down entirely. According to the PNUCC plan, aluminum plants would be assured long-term sources of power if they gave up their current contractual rights to low-cost federal hydroelectric power rather than waiting for contracts to expire in the mid-1980s. The plan was introduced into Congress as Senate Bill 2080 and House Bill 9020 with the intent of amending the Bonneville Power Act by establishing a region-wide energy conservation program along with a regional planning body that would reallocate existing low-cost federal hydroelectric power. As part of the plan’s conservation measures, a $300 million revolving fund would be made available for insulation and other energy conservation measures in residences. For the region’s aluminum industry, conservation measures would mean modernizing old but expensive smelter plants. Such conservation measures applied best to newer plants. By June 1978, it appeared that the two bills would not pass Congress in full, although portions of the bills might be incorporated into an overall solution for the regional energy problem. Aluminum companies and utilities agreed that some sort of regional energy legislation was needed from Congress to remedy these problems. [75]

The most notorious of all regional power plans was the Washington Public Power Supply System (WPPSS) – often disparagingly referred to as “Whoops.” The Washington State Legislature passed a law

establishing WPPSS from 16 public utility districts in January 1957. The organization was authorized to acquire, construct and operate plants and facilities for the generation and transmission of power, and by 1977 more than 100 utilities had participated in the organization's projects, serving 2.5 million people. [76] In 1960, the organization built the Packwood Lake hydroelectric power project, and in 1961 it began plans for a 400-megawatt co-generation power plant using waste heat from the Hanford New Production Reactor, a reactor that was built and operated to produce weapons-grade plutonium. The Hanford power plant went online in 1966. With these successes under its belt, WPPSS began developing plans for construction of three new nuclear power plants that would fall within the BPA's Hydro-Thermal Power Program, which evolved in the late 1960s. The advantage for WPPSS was that it could use the prestige and respect of the BPA to hide the risk of building nuclear power plants when raising money through the sale of bonds. When WPPSS was all over and done, only one of the three nuclear power plants was ever built at a combined cost of more than $6 billion. Two more nuclear power plants, planned without BPA support, were also canceled and defaulted on their bonds. A severe recession between 1980 and 1985 caused rate instability in the region's power market. The costs of WPPSS nuclear power plants No. 1, 2 and 3 cost BPA customers nearly $800 million per year. [77]

Among the many WPPSS customers was the Anaconda Aluminum Co. – in November 1981, AAC sent a check for $643,250 to the BPA as its share in the "preserve-the-assets program" for Nuclear Projects 4 and 5. The "mothballing" program was expected to cost the AAC plant $3.2 million when completed. Six aluminum companies and six other heavy industrial companies paid a first installment to the BPA of $6 million for the program, which was expected to cost these companies $30 million when completed. [78] By late July 1983, power rates to aluminum producers in the Pacific Northwest averaged $24 per megawatt-hour. Rates had increased 700% since 1979, chiefly due to construction problems related to the proposed nuclear power plants. A decision in June 1983 to indefinitely delay construction of WPPSS's Satsop No. 3 nuclear power plant was expected to have a downward effect on rates. [79] In September 1985, Jim Litchfield, director of power planning for the Northwest Power Planning Council, defended the council's decision to leave two unfinished WPPSS nuclear power plants out of its most

recent energy plan. Lawsuits against WPPSS had prevented the power system from selling bonds to complete the two power plants, and there was uncertainty that the power would ever be needed. If direct-service industry customers like aluminum plants were to leave the BPA in 2001, the BPA would find itself with a surplus of 2,500 megawatts of power, Litchfield explained. [80]

The Pacific Northwest-Pacific Southwest Intertie emerged from a greater regional plan, one that saw the benefits of sending excess Pacific Northwest power in summer south to run air conditioners in the Pacific Southwest, and sending excess Pacific Southwest power in winter north to run heaters in the Pacific Northwest. The idea of linking the BPA power grid with population centers in the Pacific Southwest began with a study by the Bureau of Reclamation following a severe power shortage in 1949. The proposal of a 230-kilovolt Intertie between the BPA system and the Central Valley Project in California was considered feasible, and the Federal Power Commission's 1959 economic study supported the Intertie idea. In 1961, President John Kennedy told Congress that he had directed Interior Secretary Stewart Udall to develop plans for linking power systems under his direction in order to develop a national power pool. On March 10, 1961, Udall appointed a special task force headed by the BPA administrator to make a comprehensive study of the Intertie proposal. According to a BPA-history, the task force was to include in its study "legal safeguards to protect regional priority to electricity generated within the respective regions" while integrating power supplies in Canada, the Pacific Northwest and the Pacific Southwest. [81] De-regulation of power markets in the 1990s, which several large and unscrupulous electrical companies took advantage of, led to skyrocketing power prices and eventually rolling black-outs across California. The Intertie enabled the 2000-2001 West Coast Energy Crisis to spread north and shut down the entire Pacific Northwest aluminum industry. More than half the smelters never reopened, foreshadowing the end of aluminum production in the Pacific Northwest.

The hydro-thermal program

For decades, hydropower was a symbol for the Pacific Northwest – big dams meant steady clean power, unless there was a drought. As hydropower potential was tapped out and growth continued, one

option to keep supply ahead of demand was to start building thermal plants – using coal, oil, gas or nuclear energy. In 1957, the Joint Congressional Committee on Atomic Energy recommended that a dual purpose nuclear reactor be built at the Hanford Works in Washington that would produce both weapons-grade plutonium and electrical power. With Congressional authorization, the Atomic Energy Commission contracted with WPPSS for the sale of byproduct steam from the New Production Reactor. The 800-megawatt reactor began supplying power to the BPA grid in April 1966 – the largest nuclear generating plant in the world at the time. The Hanford plant filled a development gap for the BPA until new dams could come on line, and allowed the BPA to continue selling power for industry while meeting its commitments to public and private utilities. [82]

The mixing of hydro and thermal power sources in a single power system took a serious step forward in October 1966 when the BPA joined with 108 utilities to create the Joint Power Planning Council with the goal of making a smooth and economic transition into a hydro-thermal power-generating system. The BPA would not build any thermal plants, but its hydropower plants would be used to create a base load that would optimize power efficiency and help keep costs down. The Hydro-Thermal Power Program was a cooperative plan that called for $15 billion in construction over the next 20 years. According to the agreement, the federal government would continue to build and operate high voltage transmission lines and hydroelectric facilities, while public and private utilities would build thermal plants that were located, sized and scheduled to meet local needs. The BPA would also acquire and exchange power with the utilities. [83] In 1968, the Joint Power Planning Council recommended spending $15 billion over 20 years on the Hydro-Thermal Power Program, but the plan’s cost increased to $17.9 billion by 1969. About $6.1 billion was to come from the U.S. government, with the rest coming from participating utilities. Coal-fired power plants in Centralia and Wyoming and the Trojan Nuclear Plant were built, but many other plants were never constructed, including three nuclear plants in Washington that left a debt of $6.2 billion in 2003. [84]

The Hydro-Thermal Power Program plan was predicated on two key ideas. First, only large thermal plants were economical, preferably

more than 1,000 megawatts, but since no single utility or small group of utilities could absorb the power generated by so large a power plant, such plants needed to be integrated into a larger system. Second, the BPA's sale of interruptible power to industry provided the sufficient forced outage reserves to make construction of additional generating plants unnecessary. According to a BPA-history, the blending of hydroelectric and thermal power was not a new idea and, in fact, was a preferred goal among power planners since the 1920s. For example, from 1951 through 1974 the Tennessee Valley Authority increased its thermal power supply from 13% to more than 75%. The abundance of hydroelectric potential in the Pacific Northwest had allowed the region to delay large-scale integration of thermal plants. The success of the Hydro-Thermal Power Program, however, was threatened by continuing energy shortages. By 1971, power planners recognized that delays in the construction of power plants was affecting the efficiency of the Hydro-Thermal Power Program, and in December 1972, BPA Administrator Donald Hodel announced that net-billing would no longer be available to help finance nonfederal power plants after 1982. Net-billing was a financial procedure used to help the BPA indirectly fund nonfederal power plant projects, particularly nuclear. [85]

By 1966, electrical power usage had been growing at an annual rate of about 7% per year for several decades, partially a result of the growing Pacific Northwest aluminum industry. But in the early 1960s, the BPA and others recognized that continued 7% growth would be difficult if not impossible to sustain. With a formal nod to the mixing of thermal and hydropower, particularly nuclear, the Hydro-Thermal Power Program called for the construction of seven large nonfederal thermal plants that would be connected to the BPA grid to provide peaking capacity to existing hydroelectric generating facilities. The BPA was prevented by law from building power generating plants, so it turned to a book-keeping procedure called "net-billing" to evade this constraint. Prices for these future power generating projects was not set, and the BPA operated on the principle that if net-billed liability increased, it would simply raise rates. The overall effect of net-billing was to combine the higher costs and risks of thermal power with the historically lower costs of hydropower, resulting in a situation where ordinary BPA customers in effect were financing the construction of new thermal plants. If the thermal plants had been financed by private

utilities instead, their rates alone would have reflected the higher costs of building these facilities. In the late 1960s and early 1970s, four thermal plants were added to the BPA system by net-billing arrangements – 30% of the Trojan nuclear power plant; 100% of WPPSS's nuclear power plants No. 1 and 2; and 70% of WPPSS's nuclear power project No. 3. [86]

In the BPA's annual report for 1967, BPA Administrator H.R. Richmond reported that the BPA had assumed a leadership role in organizing region-wide planning for the 15,000 to 16,000 megawatts of thermal generation that the Pacific Northwest would need in the next 20 years. While the BPA's rates continued to meet repayment schedules to the U.S. Treasury, the first portion of a 500 kilovolt Pacific Northwest-Pacific Southwest Intertie had been energized, three treaties had been signed with Canada for new water storage projects, and the 800-megawatt Hanford Plant had gone into full operation in 1967 – still power shortages were expected. According to the BPA's 20-year Advance Program, firm energy loads were expected to double, reaching 30,000 megawatts by the mid-1980s. To meet that forecast demand, non-federal utilities expected 15 large thermal generating plants would need to be built and 5,000 megawatts would need to be added to hydropower plants, along with all the required transmission facilities. The federal role of providing transmission lines, peaking capacity and supplying surplus hydropower could cost an investment of $14.3 billion. "Perhaps the most disturbing disclosure resulting from load resource studies is the finding that on the basis of presently assured resources, BPA will be unable to meet fully the power requirements projected for the Northwest's electro-processing industries," the annual report stated. "It is estimated that the Northwest will have to turn away over the next 20 years, seven out of every 10 potential new electro-process industries due to an insufficiency of firm, low-cost power." [87] Seven of the 10 Pacific Northwest aluminum plants were shut down by end of the millennium, but the final straw may have been deregulation and the Intertie.

The Joint Power Planning Council released its plans for Phase 1 of the Hydro-Thermal Power Program on Oct. 22, 1968. The plan was approved by the Nixon administration on Oct. 27, 1969, and was implemented by Congress in the Public Works Appropriations Act of

1970. A key element of the plan was net-billing, which allowed the BPA to take power from non-federal sources, blend it with federal power and sell the power to its different classes of customers. Two unexpected problems limited the use of Phase 1 to address regional power needs – the cost of building new thermal power plants skyrocketed, exhausting the BPA's ability to pay for new plants through the net-billing system and, most importantly, a 1973 ruling by the Treasury Department and the Internal Revenue Service prevented the BPA's preference customers from using tax-exempt bonds to finance additional thermal power plants. [88] The final straw for the Hydro-Thermal Power Program came with plans for a controversial new aluminum plant to be built by Alumax on the Columbia River in Oregon.

A halt to the program

In the BPA's annual report for 1969, Richmond and Interior Secretary Walter Hickel described the year as "one of the most eventful periods in Bonneville's history," with the Nixon administration's approval of the joint Hydro-Thermal Power Program and Congress' approval of the Public Works Appropriations Bill for the program in fiscal year 1970. Several large thermal power plants were already under construction, including a coal-fired plant in Centralia, a nuclear plant in Rainier, Ore., and a coal-fired plant near Rock Springs, Wyo. Four new hydro dams were under construction by the Army Corps of Engineers and the Bureau of Reclamation, and additional generators were being installed at four existing hydro dams. Still, power shortage problems existed. Unusually high power demands in December 1968 through January 1969 caused by unusually low temperatures coincided with a temporary power outage at the Hanford nuclear plant and delays in new federal generator installations. As a result, the BPA imported 700 megawatts into the region and curtailed as much as 400 megawatts of interruptible industrial loads during peak periods. [89]

Then, in early September 1969, according to the BPA annual report, record-low stream flows caused a shortage of hydropower, and exports of power stopped on the Pacific Northwest-Pacific Southwest Intertie. Finally, heavy rains in the last two weeks of September improved the situation. "We are approaching a serious power supply situation in the Pacific Northwest over the next five years," the report stated. "Repeated delays in generator unit installation schedules at key

federal hydro projects in the region will result in utility loads outstripping resources during the years 1970-1975." The report anticipated a deficit of 1,154 megawatts at its height in 1973 to 1974. "The situation is even more alarming than suggested by the table," the report stated, because it made some assumptions about future resource availability. Problems with construction of new power plants in California, for example, could mean 790 megawatts that could not be sent over the Intertie during winter months in 1974. "Much of this bleak short-run outlook stems from the very long lead time required for construction of hydroelectric projects and large modern steam plants," the report stated. The Nixon administration's approval of the Hydro-Thermal Power Program, however, "brightens the prospects for meeting regional loads after 1975," the report stated. That and no "slackening of effort" to meet the program's construction demands, the report noted. [90]

On Dec. 14, 1973, the BPA and members of the Joint Power Planning Council announced a plan to implement the Hydro-Thermal Power Program through 1986, introducing Phase 2 of the program. According to the BPA's July 1977 environmental impact statement for the program, "The costs of thermal power were increasing rapidly and exhausting the net-billing capabilities of BPA customers." Forecasts showed that by fiscal year 1984, there would be a deficiency of more than $60 million in operating revenues for the program. Under Phase 2, federal power projects would continue to be built under federal budget and direction, and thermal plants would continue to be built by investor-owned utilities. But net-billing would only apply to Phase 1 projects, the BPA would only acquire small portions of capability from new thermal projects, and direct-service industrial customers could purchase up to 1,000 megawatts from new thermal projects to improve the availability of their interruptible power. Under a Trust Agency Agreement, preference customers could elect to purchase all or part of their thermal generation independently, or they could request that the BPA act as their agent in purchasing power for them. Phase 2 also introduced the concept of Industrial Firm Power, a lower grade of power than previously sold to industry, especially aluminum smelters. Up to three-fourths of Industrial Firm Power could be interrupted to cover construction delays for new thermal plants, and it would be available under 20-year contracts. [91]

Phase 2 also called for self-financing by the BPA, which led eventually to passage of the Federal Columbia River Power Transmission System Act on Oct. 18, 1974. [92] Prior to the Act's passage, the BPA was forced to go through the Congressional appropriation process every year, where competing budgetary interests interfered with the BPA's ability to undertake long-range planning and construction of transmission facilities. Under the new Act, the BPA's annual budgets and major projects continued to be reviewed for approval by the Office of Management and Budget and the Congress, while the BPA continued its statutory requirements to repay the U.S. Treasury for any power-related investments in federal hydroelectric projects. [93] By June 1975, more than 21,000 megawatts of generating capacity existed in the Pacific Northwest, and an additional 8,000 megawatts was under construction. Thermal-generating resources totaled about 3,600 megawatts, with an additional 2,400 megawatts under construction. The Federal Columbia River Power System provided about 50% of the region's power, and more than 120 utilities served the region's consumers. [94]

Then on Aug. 26, 1975, the Federal District Court for the District of Oregon delivered its opinion in the Alumax case which put a temporary halt to the Hydro-Thermal Power Program. The court decision suspended the signing of any new BPA industrial contracts until completion of an environmental impact statement on the program. Issues that needed to be addressed included criticism over forecasting methodologies that called for more power generation, difficulties faced by utilities in finding financial backing to complete construction of new generating plants, construction delays caused by siting and licensing procedures, the need to look at alternative generating systems, inequitable distribution of federal power, continued rate increases, widening disparities in retail rates, and the need for a significant and effective conservation program. [95]

In April 1976, the BPA published a report on electric power in the Pacific Northwest that included forecasts on power generation and consumption for the region. There were a total of 160 hydropower plants in the region, including investor-owned, publicly owned and federally owned. There were 29 federal hydroelectric projects on line in the region with an installed capacity of about 12,500 megawatts,

accounting for about half the region's power generation. With few undeveloped, economically feasible or socially acceptable hydroelectric sites remaining in the region, the Hydro-Thermal Power Program called for construction of 11 nuclear plants and three coal plants in the region and another eight coal plants just outside the region by the end of the 1980s. Included in the program were three coal-fired plants at Colstrip in Montana, two nuclear plants on the Skagit River north of Seattle, two WPPSS nuclear plants near Centralia, three nuclear plants at Hanford, and two nuclear plants at Pebble Springs, Ore. [96]

According to PNUCC's latest forecast, the BPA reported, generation of firm power to meet regional loads in the next 20 years would need to more than double to about 36,000 average megawatts. About 99% of this additional energy would need to come from thermal projects. Furthermore, peaking power requirements over the next 20 years would triple to about 73,000 megawatts. Hydropower plants could provide about 34% of future peaking requirements by installing new generators at existing dams. Construction of a third powerhouse at Grand Coulee, for example, could provide about 8,000 megawatts of additional peaking capacity, the BPA reported. It was estimated that by 1995, hydroelectric plants would be used increasingly for peak demands while thermal plants would operate principally to meet firm power demands. Hydropower plants could be more easily turned on and off to meet swings in demand, while thermal plants operated more efficiently with steady loads. It was estimated that more than $30 billion would be needed to construct new generation, transmission and distribution facilities to meet regional loads forecast for the next 20 years. This implied that regional utilities needed to raise about $4.1 million per day, or about $3,000 per minute, just to meet load growth. [97]

In fiscal year 1976, the BPA made use of its new self-financing ability to pay a portion of its net-billing obligations for the Trojan nuclear power plant project. Under Phase 1 of the Hydro-Thermal Power Program, the BPA needed to acquire sufficient power to meet its preference customers' load growth, to meet existing industrial loads and to meet limited industrial plant expansion, as well as existing loads for industrial technological and environmental needs. To satisfy these

industrial requirements, the BPA created new industrial contracts under a revised Industrial Service Policy. Under the policy, industrial loads could be interrupted in their entirety for up to five minutes for system reliability, and half the industrial load could be interrupted for up to two hours for system reserves. Furthermore, only three-fourths of a direct-service industrial customer's load could be met with modified firm power. The remainder would have to be interruptible power, which could be restricted at any time for any reason. The BPA could restrict delivery of the modified firm power, in whole or in part, to meet other obligations incurred by delays in construction of new federal generating plants. The new industrial sales policy eliminated some direct-service industrial customers, who could not work under the new restrictions, and the BPA agreed to take that into account in its future rate increases. [98] Nearly all of the BPA's direct-service industrial customers were aluminum smelters.

The Role EIS

Phase 2 of the Hydro-Thermal Power Program was short-lived – federal court rulings in 1975 and 1977 combined with rising construction costs and brought the program to a halt. The first court ruling, called the Alumax Case, was decided on Sept. 15, 1975 and called for an environmental impact statement to be conducted before the BPA could sell power to a new aluminum smelter in Umatilla, Ore. It was the perceived threats of pollution and power shortages that held up the Alumax aluminum smelter project and led to the 1975 court decision. The second court ruling was made by the U.S. District Court of Oregon on July 1, 1977, in a lawsuit brought by the Natural Resources Defense Council. The BPA was required in the second ruling to prepare a programmatic environmental impact statement for its long-range plans for electrical generating facilities in the Pacific Northwest. [99]

On July 22, 1977, the BPA issued its draft environmental impact statement on "The role of the Bonneville Power Administration in the Pacific Northwest power supply system, including its participation in a hydro-thermal power program," commonly called the Role EIS. In describing the importance of regional power planning in the face of growing demand and anticipated shortages, the BPA noted the actions of more than 100 "independent, resolute and strong-minded utilities in the region involved with the federal government in planning, building

and operating a coordinated regional power system." With power generated by thermal power plants costing more than power from hydroelectric dams, these BPA customers competed for their share of the lower cost power. [100]

According to the draft version of the Role EIS, "The BPA maintained that the transition from essentially all-hydro to combined hydro and thermal was a regional responsibility, one which required cooperative planning by all segments of the regional power system." The program's goal was for the regional utilities to maintain the "lowest practicable rates" based on regionally planned generation. New thermal plants would be financed in part through net-billing, which allowed the BPA to avoid having to go to Congress for the money to help pay for the new plants. In event the utilities were unable to meet the financial obligations of building the new projects, the BPA would pay the balance in cash from the Bonneville Power Administration Fund as an operating expense. The net-billing procedure also helped utilities seeking to build thermal plants by boosting the rate on bonds issued to finance new construction through assurances from the BPA. The net-billing arrangement underwent change after passage of the 1974 Federal Columbia River Transmission System Act, which made the BPA a self-financing agency. After then, BPA expenditures from the Bonneville Power Administration Fund did not require formal approval by Congress. [101]

Included in the Draft EIS were specific regional proposals that addressed issues raised in the Alumax case. In January 1977, the region's utilities and its direct-service industry customers, under the PNUCC's auspices, had proposed the Pacific Northwest Electric Power Supply and Conservation Act to revise the BPA's existing legislative authority. Under existing law, the BPA had no bonding authority to provide for conservation. The PNUCC proposal would establish a $300 million BPA fund for conservation grants and loans. The PNUCC proposal also would create a new regional planning organization called the Pacific Northwest Electric Planning and Conservation Organization that would be responsible for making regional load and resource forecasts and then authorizing construction of new generating resources. The organization's plans would be passed on to the BPA for implementation. [102]

Another proposal presented in the Draft EIS came from Rep. James Weaver of Oregon. Under Weaver's House Resolution 5862, a new government corporation called the Columbia Basin Energy Corporation would be created as the sole marketer for electric power in the Pacific Northwest. A third proposal in the Draft EIS came from the Natural Resources Defense Council, which was especially critical of existing plans to build large thermal plants. The council believed power forecasts substantially overstated the need for additional generating capacity in the Pacific Northwest, that significant savings could be achieved by encouraging more efficient use of electricity, and that cleaner and less capital-intensive energy technologies needed to be investigated. Two other proposals in the Draft EIS came from Oregon Gov. Robert Straub and Portland Commissioner of Public Utilities Frank Ivancie. [103]

The BPA issued its Final EIS in December 1980 in accordance with the Natural Resources Defense Council v. Hodel court ruling in 1977. "The EIS examines a range of alternative roles for BPA in influencing the future regional power supply," the Final Role EIS said. The demise of Phase 2 of the BPA's hydro-thermal program through a court ruling had left the agency in limbo. "BPA feels that a regional energy program would best serve the interests of the region by assuring that regional electrical needs would be met," the Final Role EIS said. "However, such a regional program does not now exist, nor is it within BPA's present authority to implement one." The demise of the hydro-thermal program also led to forecast power shortages. "BPA is not proposing, nor can it identify, and consequently does not evaluate, any existing discrete program to solve the projected energy shortage of the region," the Final Role EIS said. "While the Hydro-Thermal Power Program was designed to solve that problem, BPA's present authority does not permit such a program." [104]

The Final Role EIS looked at four alternatives related to the BPA's legislative authority – existing, expanded, reduced or new – along with the BPA's role in the region. The BPA's proposal was optimum use of the BPA's existing legislative authority. "The most fundamental conclusion reached in this analysis is that the one-utility concept offers environmental, economic and technical advantages in the development and operation of a regional power supply system, which

increases as the application of the concept is increased," the Final Role EIS said. "Additionally, it was concluded that there are no viable alternatives to the one-utility concept for the existing Pacific Northwest electrical power system." The BPA noted that controversy over this position was expected, including over issues of rates, allocations, future resource development, the level of BPA authority to purchase power resource capability, the effect of BPA services on resource development, and the degree of public and state involvement in regional power planning decisions. Two unresolved issues remained – the outcome of ongoing legislative efforts that could alter the regional power planning process, and the future power resource mix to be developed. [105]

The Northwest Power Act

The Alumax case and the Role EIS had left a leadership vacuum for power planning in the Pacific Northwest. With that in mind, hearings for the Pacific Northwest Electrical Power Planning and Conservation Act began to be scheduled in Congress by fall 1977. The Act sought to establish more equitable power rates between customers of investment-owned utilities and public utilities, and to assure them a continuous supply of energy. The Act would also allow the 10 Pacific Northwest aluminum plants to sign a 35-year power contract. Support for the Act was driven by fears of power shortages in the 1980s, and the affected parties turned to the federal government to find a regional solution. According to the fall 1977 issue of the Reynolds Northwest News, "We were lucky in 1973 when heavy rains got us out of trouble." The utilities would lead the regional planning, not the direct-service industries, because the utilities were legally responsible to provide power to customers. The direct-service industries, which were primarily aluminum smelters, used about 22% of the power from the BPA, but half of that was interruptible reserve power. [106]

On Nov. 17, 1980, the U.S. House passed what came to be called for short the Northwest Power Act by a vote of 284 to 77. For Montana, Rep. Pat Williams voted for the bill and Rep. Ron Marlenee voted against it. Williams later told the media that he "had to hold his nose to vote for it," but felt he had to vote for the bill "because of the jeopardy to Anaconda Aluminum if it had not passed. It became a jobs issue." Williams said he had received numerous phone calls, telegrams and

letters urging him to vote for the bill. He also talked to plant workers and management during the recent Congressional recess. One amendment Williams added to the bill was that each of the four states involved in the new BPA power council would have equal representation. A spokesman for Marlenee explained that he had voted against the bill because of his concern about the BPA's expanding role in the region. Two days later, the U.S. Senate voted in favor of the House version and the bill was forwarded to President Jimmy Carter for his signature. Sen. John Melcher voted for the bill. If the bill became law, the AAC plant in Columbia Falls would receive a 20-year electrical power contract. [107]

The Northwest Power Act provided the BPA with the authority to buy and resell electrical power from new generating plants. The BPA agreed to purchase power from expensive coal- or oil-fired plants and from future nuclear plants which were scheduled to become part of the Washington Public Power Supply System. By law, the BPA had to figure those additional costs into rates charged to its customers, but by the 1980s it was seen that the BPA had overestimated future demand for power and underestimated conservation measures taken by customers. The result was that the region had an oversupply of electrical power at the same time aluminum plants were cutting back production because of low metal market prices. By the mid-1980s, electrical rates had increased significantly to account for the billions of dollars spent on generating plants that would never be built. Rates climbed in the Pacific Northwest from as low as $2.90 per megawatt-hour in 1980 to $26 in 1985, while the worldwide average was $17 in 1985. Critics of the electrical industry often accused the BPA of subsidizing aluminum producers at the expense of residential consumers, but by 1985 aluminum plants in the Pacific Northwest were paying for a greater share of BPA's electrical power than they actually consumed, and if high costs forced aluminum plants to close, then other customers would be forced to pick up the tab, including residential consumers. [108]

The Northwest Power Act initially was a boon for Pacific Northwest aluminum companies because it provided something they had long wanted – long-term power sales contracts. In exchange, the companies agreed to pay a premium in those contracts that would be used to

finance the “residential exchange.” The exchange called for the BPA to provide low-cost power for like-amounts of higher-cost power from investor-owned utilities so all residential and small-farm power customers in the Pacific Northwest would pay about the same per-kilowatt-hour charge. The difference would be made up by the direct-service industries, primarily aluminum smelters, but the rate increase was presumably offset by the stable long-term costs. “It made sense at the time, given the chaos caused by rising costs and increasing public disillusionment over the participation by Bonneville and many of its customers in building five nuclear power plants to augment the hydropower supply,” the Northwest Power and Conservation Council’s website stated in August 2015. The BPA had raised its rates by nearly 250% from 1979 to 1983, a devastating blow to the regional aluminum industry. The higher rates affected their competitive position in the global marketplace. [109]

About one-third of U.S. aluminum producing capacity was located in the Pacific Northwest, and according to the Northwest Power Act, the BPA was not allowed to enter into new contracts with direct-service customers unless the agency could guarantee anticipated regional power demand. In August 1981, Alumax signed a tentative power supply agreement with the BPA for a new smelter plant that would be built in Umatilla, Ore., and begin operation by July 1987. The Alumax deal showed the BPA’s willingness to continue selling power to aluminum companies, but the proposed smelter and the power contract and led to loud vocal opposition and a major court decision. [110]

Among the key changes made in the 1980 Northwest Power Act were the emphasis on fish and wildlife conservation, particularly salmon on the Columbia River, and the creation of a Northwest Electric Power and Conservation Planning Council. The council was to be composed of two members from each Pacific Northwest state – Montana, Idaho, Washington and Oregon – appointed for three years. The council was directed to form a voluntary advisory committee to gather scientific and statistical information that would aid the council in developing a regional conservation and power plan. The plan would include an energy conservation program, a methodology for determining environmental costs and a demand forecast for the next 20 years. The council was directed to begin right away at developing a program to

protect, mitigate and enhance fish and wildlife. In the case of anadromous fish, the council was directed to provide for improved survival of such fish at hydroelectric facilities located on the Columbia River and to provide flows of sufficient quality and quantity to improve production, migration and survival of such fish. Consumers of power generated by BPA facilities would bear the cost of these fish and wildlife conservation efforts. All sales of power by the BPA were subject to the preference and priority provisions of the 1937 Bonneville Project Act. The BPA administrator was directed to sell power to direct-service industrial customers that would act as reserves for firm load power to other customers. The Northwest Power Act directed the BPA to offer DSI customers a long-term contract equivalent in amount of power to the DSI customers' earlier 1975 contracts, but the BPA could not sell power directly to new DSI customers or sell more power to existing DSI customers. [111]

The BPA was also instructed in the 1980 Northwest Power Act to offer long-term contracts to its public utility, cooperative and investor-owned utility customers. The BPA was then instructed to "sell, or otherwise dispose of" surplus power. The BPA was also instructed to establish and periodically review rates for the sale and disposition of power. The rates would be reviewed by the Federal Energy Regulatory Commission to see that the rates were based upon BPA's system costs – including rates for preference customers. Rates for direct-service industrial customers were to be based on the BPA's wholesale rates to preference customers and the typical margins for preference customers when they sold to industrial customers, along with other considerations. The BPA was allowed to sell power to DSI customers at a discounted rate if they used "raw materials indigenous to the region as its primary resource." The aluminum smelters used bauxite, which was imported, so they did not qualify. [112]

Looking back in 2011, the Northwest Power Planning Council called passage of the 1980 Northwest Power Act "something of a watershed for the politically powerful aluminum companies" in the Pacific Northwest. The aluminum companies and other DSIs got what they wanted – long-term power sales contracts. In exchange, the companies paid premiums to help BPA finance the "residential exchange," which helped residential and small-farm customers pay similar prices for

electricity. The DSIs made up the difference between low-cost federal power and high-cost power from investor-owned utilities, but they gained the stability of long-term contracts. Passage of the Northwest Power Act coincided with public distrust following the BPA's involvement in five nuclear power construction projects. Problems with the nuclear power plants forced the BPA to raise rates by nearly 250% from 1979 through 1983. The rate hikes also hurt the DSIs – aluminum companies lost a competitive advantage in the global market. The BPA tried to fund an energy conservation program for the aluminum smelters, but the program didn't work with the smelters' aging equipment. [113]

The power act's impacts

Congress passed the 1980 Northwest Power Act to settle disputes between the BPA and the region's public utilities, investor-owned utilities and direct-service industries. The Act tried to promise something to all parties, according to the Cato Institute's Peter Cooper in 1986. The public-utility districts retained their preference status and a promise that their rates would remain the same as if the Act had not been passed. For the investor-owned utilities, the Act promised to narrow the rate disparity between the PUDs and the IOUs and to grant more federal power to the IOUs. The Act promised a reasonable supply of firm power to the direct-service industries, which an impending power shortage had threatened to end. The Act made the BPA responsible for fish restoration and provided funding for conservation efforts. Finally, the Act mandated that the BPA, in conjunction with the Northwest Power Planning Council, become the region's central authority for planning and coordinating electrical power supplies in the Pacific Northwest. [114] The formulas used in the 1980 Northwest Power Act to provide rate relief to residential and small farm customers that purchased power from investor-owned utilities were difficult and outmoded, and a new system evolved in 1998. [115]

An important tool provided to the BPA in the Northwest Power Act was a newly granted authority to acquire power. The Act required the BPA to offer power to both public and private utilities when they requested it, even if the BPA was forced to sell more power than it had on line. In that case, the BPA would have to purchase power on the open market. The acquisition authority was central to the Act's goal of solving the

anticipated future power shortage, Cooper said. The Act also created the Northwest Power Planning Council, whose staff of economists and analysts in Portland were responsible for developing 20-year forecasts and plans to be used by the BPA as guidelines for designing policy. The residential exchange system, in which the direct-service industry customers paid the BPA a premium which was used to address the rate disparity between PUDs and IOUs, lasted only through 1985, by which time the cost of making up the difference was spread among all BPA customers. [116]

The change in 1985 reflected the rate instability facing most direct-service industries, which had seen their power rates climb 700% from 1979 to 1985, Cooper said. The rate hikes and the 1981-1982 recession nearly wiped out the aging Pacific Northwest aluminum industry. By 1985, BPA's preference rate was $22 per megawatt-hour while the DSI rate was $26, but the BPA created a special "incentive rate" of $19 to promote consumption by the DSIs. The BPA recognized that if the aluminum plants and other DSIs disappeared, so would one-third of the BPA's revenues, leaving the agency in serious financial difficulty. At the time, the idea of selling power to California was not feasible because the Pacific Northwest-Pacific Southwest Intertie was limited to 400 megawatts, about 25% more than the typical load of an aluminum plant, and there were 10 aluminum plants in the Pacific Northwest. If several aluminum plants shut down, the power could have remained in the Pacific Northwest unused. [117]

There was also pressure in 1985 from the White House. In early February, President Ronald Reagan introduced a new federal budget that called for accelerating BPA payments to the U.S. Treasury at current interest rates. If approved by Congress, the BPA would be forced to charge higher power rates. The Treasury payments were for money used to build federal hydroelectric dams in the Columbia River basin. [118] In February 1985, Rep. Williams criticized the proposal by Reagan's Office of Management and Budget to restructure BPA's Treasury payments. The OMB plan was intended to increase federal revenues and included raising the interest rate on the $5.9 billion of federal debt from 6% to 12% or 13%. The plan would also put the BPA on a fixed annual amortization schedule. Williams cited a Department of Energy study that showed such a plan would force the BPA to

increase power rates by 80% and could close 80% of the Pacific Northwest aluminum industry. “If one of the industrial users in the Pacific Northwest were to close because of this rate increase, the lost revenues from power sales would have to be absorbed in the general rate base,” Williams said. “This type of cost averaging could cause a chain reaction with the greatest burden falling on residential customers.” The restructuring plan could cost 65,000 jobs and force a rate increase of 81%, Williams said. “People in the Northwest agreed to allow their streams and rivers to be used to generate power, and we in return were guaranteed certain payback rates and low interest,” Williams said. “Now the federal government proposes we no longer adhere to these agreements. It is patently unfair and unequitable to change the terms midstream on the payback of a mortgage… merely because the administration wants more money to reduce the federal deficit.” [119]

The 1980 Northwest Power Act offered conditions that AAC was looking for. In December 1980, AAC signed a power contract with the BPA to purchase 378.6 megawatts of electric power, equivalent to the electrical demand of 120,000 homes. The plant paid $16.8 million per year for this power, but the power bill would soon triple to $43.2 million per year. Each reduction pot at the plant used about 360 megawatt-hours per month. The reduction process at the smelter in Columbia Falls used about 96% of the power supplied to the plant, with the rest going to lights, fans, motors and general use. The Hungry Horse Dam, which was capable of providing no more than 255 megawatts at peak and much less based on average rainfall, could not supply all the plant’s power needs. [120]

In 1937, when the Bonneville Power Act was passed by Congress, public utility districts and electrical cooperatives received preferential treatment for power contracts because developing the rural areas of the Pacific Northwest was a national policy goal. The 1980 Northwest Power Act modified that mission. By 2009, with most of the region’s 10 aluminum smelters no longer operating, and with new needs for power, talk about revising the 1980 act was gaining strength. When the 1980 act was being drafted “in Henry Jackson’s kitchen, with his staff doodling on napkins,” the idea was that aluminum smelters and other direct-service industries would consume large amounts of power from

the BPA and help pay for the dams, according to John Harrison, an historian and spokesman for the Northwest Power Council. This idea was not specifically expressed in legislation, but it was widely understood, Harrison said. [121]

The idea worked for several decades, but in 2001, when the region's 10 aluminum smelters were using 3,000 megawatts to produce one-third of the nation's aluminum, the BPA decided not to renew the companies' long-term contracts, Harrison said. By that time, BPA rates had gone up so steeply that some aluminum companies had opted to purchase power on the open market. Then competition by new aluminum smelters in foreign countries increased dramatically, and the older Pacific Northwest smelters could no longer compete effectively. If the 1937 and 1980 acts were open to revision, the following things were possible outcomes – the BPA could sell its power on the open market, the BPA could stop financing energy conservation programs, or the BPA could sell Pacific Northwest power to other regions. [122] Construction of the Pacific Northwest-Pacific Southwest Intertie made the latter option viable.

The BPA's overall mission, beginning with its inception in 1937, has often been cited in court cases. On Dec. 17, 2008, the Ninth Circuit Court of Appeals issued an opinion on a complex electric power case involving numerous utilities, direct-service industry customers and the BPA. "At their origins in the New Deal, the Bonneville Project's hydroelectric operations in the Pacific Northwest, administered by the BPA, were promoted as spreading the benefits of affordable federal power widely, to 'the farmer and the factory, and all of you and me,'" Circuit Judge Martha Berzon said, quoting Woodie Guthrie. "At the same time, the Project gave a vital boost to the aluminum industry of the Pacific Northwest. Indeed, in the early days of the Project, what was good for BPA was good for the aluminum industry, and what was good for the aluminum industry was good for BPA. Aluminum manufacturers received low-cost federal hydroelectric power to operate energy-intensive smelting operations in the Pacific Northwest, and BPA gained a reliable market for a supply of electric power that otherwise greatly exceeded demand in a region where rural electrification was still a work in progress. BPA's synergistic relations with the aluminum industry during this early period were widely seen

as a public good. The aluminum manufacturers and the region's nascent aviation industry, which they supplied, not only brought many high-wage jobs to the Pacific Northwest, but also served as a vital strategic asset for the United States during World War II and the Cold War decades that followed. Times have changed. Public utilities and electrical cooperatives serve a larger regional population with greater needs for electrical power, to which they are statutorily guaranteed preferential access. Rising energy prices have made the relatively inexpensive federal power generated by BPA more attractive than ever, not only to BPA's regional preference customers, but also to utilities outside the Pacific Northwest. At the same time, due to a variety of factors – among them higher energy costs – the region's aluminum industry has fallen on hard times. The smelting operations of the major aluminum manufacturers, which traditionally ran on electric power purchased directly from BPA, are generally being operated at reduced capacity, and in some cases, have shut down entirely." [123]

Efforts to assist the direct-service industries and the aluminum plants ran into political and popular hurdles, but global markets also posed significant difficulties, according to the Northwest Power Planning Council in 2011. The BPA tried tying power prices to the global price of aluminum for DSI contracts in 1996, but still the companies struggled. Some aluminum companies gave up their long-term BPA power contracts and turned to the open market for power in 1996 and 1997, and the amount of power supplied by the BPA to the direct-service industries declined by about 60%. The amount declined another 40% to 1,425 megawatts in 2001. Meanwhile, technological advances and new plants were springing up around the world. Wholesale power prices increased 10 or 20 times during the 2000-2001 West Coast Energy Crisis, which provided the final blow to the industry. All 10 smelters in the Pacific Northwest shut down in 2001, and rates went up for all customers. [124]

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