

## Stairway of Power

Speaker 1 ([00:12](#)):

An aerial shot of a road next to a body of water with a title that reads the stairway of power, reshaping Nature, connecting communities.

Speaker 2 ([00:25](#)):

Steep rocky walls waterfalls a diversity of wildlife and the steady, graceful flow of a river. These features make up the landscape of the Feather River Canyon in northern California. The Feather River flows from its headwaters in plumes national forest through a picturesque but rugged landscape. The river has shaped this land over thousands of years and carved a canyon through the Sierra Nevada mountains on its journey southwest to the Sacramento Valley, the river and the surrounding forest. Covered mountains are home to a wide variety of plants and animals that have supported human occupation for thousands of years. Today, communities well beyond the boundaries of the canyon rely upon the feather river

Speaker 1 ([01:07](#)):

Power lines that deliver power to a city.

Speaker 2 ([01:11](#)):

The power of the river has been harnessed over the last century to meet the needs of modern everyday life in Northern California,

Speaker 1 ([01:18](#)):

A black and white historical photo of people posing in front of a tram.

Speaker 2 ([01:22](#)):

Many communities boomed here in the aftermath of the gold rush and the achievement of California statehood in 1850,

Speaker 1 ([01:30](#)):

A black and white historical photo of a large group of gold miners outside of a settlement

Speaker 2 ([01:36](#)):

For mining and agriculture in the mid 19th century to industrial and commercial enterprises. In the 1920s, San Francisco and the towns and communities lying between the Sierra Nevada and the Pacific Coast grew in population in a relatively short period of time. The new industries and homes in these communities required electrical power in increasing amounts,

Speaker 1 ([01:59](#)):

A black and white historical photo of multiple linemen working on power lines

Speaker 2 ([02:05](#)):

Today, residents from the San Francisco Bay area to the Sierras get their electricity from a power system first planned and built. In the early 20th century, a series of hydroelectric plants fueled by the waters of the Feather River, provides this energy,

Speaker 1 ([02:20](#)):

A hydroelectric plant harnessing energy from water flowing downstream,

Speaker 2 ([02:24](#)):

Known as the stairway of power. This system reshaped the landscape of the Feather River Canyon throughout the 20th century. As power companies built new powerhouses, dams and reservoirs to meet California's ever increasing energy demands, the stairway enabled towns and cities to develop and expand, creating the landscape, communities and economies that exist today in Northern California. The Feather River Canyon and Plumas National Forest today are linked to the Bay Area by a series of electric transmission lines that stretch hundreds of miles through the mountains and valleys of Northern California.

Speaker 1 ([03:01](#)):

A map of California depicting Lake Almanor, feeding a river that runs through Plumas National Forest into Lake Oroville, as well as red lines depicting power that feed north, south and west into the Bay area.

Speaker 2 ([03:14](#)):

The stairway of power feeds this network and connects the serene landscape of the river and canyon to modern bustling communities. Although this modern system defines much of the region today, native American peoples like the mountain maidu, have lived and thrived in areas around the North Fork of the Feather River and what is now the Plumas National Forest and Butte County. For untold generations, these areas have provided unique resources that the Mountain Maidu fished, hunted, and collected. The River Valley was also a corridor for travel outside the canyon. European American settlement in California brought about a significant shift in how people use the canyon and the river. From the mid 19th century onward, large scale, human-made industrial features began to reshape the landscape within and surrounding the Feather River Canyon and Sacramento Valley and fueled California's future growth. The discovery of gold in the Sierra foothills triggered unprecedented population growth in the state as miners arrived to seek their fortunes. From 1850 to 1890, California's population exploded from around 100,000 to over 1 million people,

Speaker 1 ([04:22](#)):

A black and white historical photo showing hundreds of people packed onto a street

Speaker 2 ([04:28](#)):

By 1890, mining operations in the Sierra created 8,000 miles of ditches, tunnels, flumes and canals, and altered the natural flow of water in the mountains. Small regional settlements, including Oroville and Marysville, supported these activities and expanded through timber and agricultural industries. The shift in livelihood for thousands of people led to large scale landscape changes as houses and towns sprung up around and within the mountains. The federal government also helped shape the landscape, preserving some of the natural resources and beauty in areas surrounding the river. Plumas National Forest was established by President Theodore Roosevelt in 1905. The forest abuts what is now Lake Almanor and includes areas of the Feather River Canyon down to Lake Oroville. The Feather River

railroad route operated by the Western Pacific Railroad, opened shortly after in 1909 connecting Oakland to Salt Lake City. The railroad crossed the Sierra Nevada following the north and Middle forks of the Feather River,

Speaker 1 ([05:32](#)):

A black and white historical photo of a railroad in the mountains next to the Feather. River

Speaker 2 ([05:38](#)):

Workers built the tracks without improved roads and had to contend with rock slides, extreme heat and lack of water. The railroad introduced more tunnels, some of which were constructed through blasting. Bridges traversed the river and new wagon, roads and settlements for those working in the canyon sprung up near the tracks when it was completed, the route opened the canyon up for new development. The railroad later carried materials that were used to construct the new hydroelectric systems. These changes set the stage for the growth of a new industry that ultimately powered towns and cities from the Sierras to the San Francisco Bay,

Speaker 1 ([06:17](#)):

A train hauling numerous cars in the mountains next to the river.

Speaker 2 ([06:23](#)):

However, European American settlement and development altered the lives of the Native Americans occupying the river and canyon areas. Gold mining operations established around big bed in the 1850s and settlements in the 1860s resulted in the forced removal of Native American communities. My you people today recall this period as a time of survival and loss of family members, customs, knowledge systems and cultural identity.

Speaker 3 ([06:51](#)):

So during the California genocide of our families,

Speaker 1 ([06:56](#)):

A woman sitting in a chair with the title Trina Cunningham, executive director, Maidu Summit Consortium,

Speaker 3 ([07:04](#)):

A lot of families from the valley area, the mata, the others fled up into the canyon areas to survive, and they hid in caves. They did everything they could to protect their families or children from being murdered and tortured. And so some of those places that are so inaccessible today were those hideouts, and so there's numerous burials and other things throughout that entire area. So to us, those are things that because the disruption happened so quickly and it was so horrific that we still haven't regrouped ourselves. And so having the opportunity to work with the Forest Service with pg and e or any other activities to have tribal monitors in that place so that we can relearn our own stories is incredibly significant to us right now.

Speaker 2 ([08:01](#)):

During this same period, settlers were beginning to develop industries in the region that demanded a power supply. In the 19th century, Californians used wood, coal, water, whale oil, and tallow as the sources for their lighting, heating, and mechanical power. Because wood supplies were located far from many population centers and coal supplies were limited and unreliable. The state's residents looked to other sources of power to support their growing industries and communities. In addition to natural and manufactured gas, hydroelectricity grew in popularity from the 1890s onward,

Speaker 1 ([08:39](#)):

A black and white historical photo of a hydroelectric plant titled Dela Powerhouse.

Speaker 2 ([08:46](#)):

Hydroelectric power is generated by harnessing moving water such as water in a waterfall. For hydroelectric plants, water often is funneled through penstock or pipe that directs the water to a water wheel or into a turbine.

Speaker 1 ([09:00](#)):

A graphic of how a hydroelectric plant works,

Speaker 2 ([09:03](#)):

Making it spin and producing electric current in a generator. This energy flows through transmission lines to the electric grid and into houses and businesses. California led the country in the use of hydroelectric power. At the end of the 19th century, rapid innovations in hydroelectric technologies, including the transition from direct to alternating current, allowed transmission lines to carry more power over longer distances. By 1904, there were 31 hydroelectric plants in the state. Many small power companies operated in California. In these early years of hydroelectric power by the early and mid 20th century, most of these companies combined to create a few dominant leaders,

Speaker 1 ([09:49](#)):

A busy map showing the hydroelectric companies that combined, including Pacific Gas and Electric Company, snow Mountain w and p Company, Western State's, g and e Company, Sierra Pacific Electric Company, and Nevada Valley's Power Company.

Speaker 2 ([10:05](#)):

One of these leaders, the Pacific Gas and Electric Company, pg and e became one of the largest suppliers of hydroelectric power in California and is one of the operators of the stairway of power. Today, the Great Western Power Company formed in 1902 and planned to develop a multi-component hydroelectric generation system along the Feather River. This scheme would consist of power plants, a storage reservoir and a transmission line to bring the new power to as far away as the booming San Francisco Bay area. One of the founders of the company and a leading engineer in dam building, Julius m Howells had surveyed Big Meadows located at the current site of Lake Almanor in the late 19th century, though Big Meadows is part of the Maidu homeland and many were still living there, Howells noted the area's potential for hydroelectric development and believed it to be the ideal place to construct a reservoir for stepped hydroelectric, use downstream. Great Western initiated construction in 1903 in the upper stretches of the North Fork, but soon realized the cost and time and money of working in difficult terrain. The company switched to building the Big Bend powerhouse located in the Sierra Foothills about 16 miles northeast of Oroville,

Speaker 1 ([11:20](#)):

A map highlighting the Feather River and showing exactly where the Big Bend Powerhouse is

Speaker 2 ([11:26](#)):

Completing the powerhouse and tunnel infrastructure. In 1908 at Big Bend Water traveled through a three mile tunnel and six nearly 600 foot long pen stocks with gravity dropping at over 450 feet into the powerhouse. When it was completed, the 10,000 kilowatt powerhouse supplied a 100 kilovolt transmission line with over a thousand steel towers that snaked 155 miles through the Sacramento Valley to reach Oakland. At the time, it was the longest and highest voltage transmission line in California, but other companies were also developing new lines to meet the state's growing demand for power and Big Bend only held its title for a year. The construction of Big Ben Powerhouse was accomplished by over 1,100 men working in seven camps around the site. It set the stage for great Western power to build more facilities along the Feather River in the 1910s. In 1914, the company completed the dam at Big Meadows. The new dam created Lake Almanor, a massive storage reservoir that provided a steady flow of water for Big Bend, far down river. Great Western power expanded the Lake Almanor Dam. In 1927,

Speaker 1 ([12:43](#)):

A newspaper clipping titled Lake Almanor will be raised 45 feet,

Speaker 2 ([12:47](#)):

Increasing the capacity of the reservoir and making it the largest in the state. By the late 1920s, the North Fork of the Feather River was home to three powerhouses, big Bend Caribou and Bucks Creek,

Speaker 1 ([13:02](#)):

A map highlighting the Big Meadows Dam, the river, and the three powerhouses that utilized its power,

Speaker 2 ([13:08](#)):

Generating power for towns in 15 counties, including some as far away as the Bay Area. In the early 20th century, Oroville Palermo, Yuba City, Marysville, and Sacramento were beneficiaries of an electricity generating juggernaut that was eventually dubbed the Stairway of Power. One of the most significant powerhouses was Caribou Powerhouse number one built in 1921. Caribou Powerhouse consisted of three generators, a 1.8 mile tunnel, and three pen stocks each over 2000 feet long with a water drop of over 1,100 feet to supply the generators in the powerhouse. The current Caribou Valona transmission line connected the caribou powerhouse to the Bay Area. The steel frame lattice transmission towers ran around 38 miles to the Feather River Canyon to Big Bend Powerhouse. From here, the line traveled immediately adjacent to the 1908 Big Bend Oakland transmission line, and passed through the cities of Oroville and Marysville to the Brighton substation, just southeast of Sacramento

Speaker 1 ([14:17](#)):

Power lines weaving through a mountainous landscape

Speaker 2 ([14:20](#)):

South of Sacramento. The line shifted west and traversed a landscape of farmland and River Delta in the Southern Sacramento Valley before shifting West again, the line met the coast range near Fairfield,

shifted Southeast and crossed the Kinia Strait to Vallejo to end at the Valona substation in Contra Costa County. The initial historic alignment represents the first connection between the Bay Area and the upper portions of the river, and served as the foundation for future hydroelectric development into 21st century.

Speaker 1 ([14:54](#)):

A paper titled National Register of Historic Places Inventory and Evaluation of 11 Transmission Lines Associated with the Historical Alignment of the Caribou Valona Transmission Corridor,

Speaker 2 ([15:05](#)):

The Historic Caribou Big Bend segment of the current Caribou Valona Transmission Alignment and Caribou Number one powerhouse are listed on the National Register of Historic Places because of their early influence on an association with the development of hydroelectric systems in Northern California. These two components of the Stairway of Power represent some of the groundbreaking work in the region that led to the complex system of power generation that is integral to the lives of millions, but the entire system includes many more components. Today, the Caribou Big Bend route included different types of towers to accommodate the varying terrain across its length. The towers associated with the Great Western developments consist of a steel H frame or a-frame with four legs. The transmission lines are attached to the towers by suspended insulators. The majority of the almost 1400 riveted steel lattice towers that made up the original Caribou Big Bend line fall into two types, mountain towers and valley towers. The Valley Towers traverse the flat bottom of the Sacramento Valley

Speaker 1 ([16:12](#)):

Blueprints for a Valley Tower showing its various separated components.

Speaker 2 ([16:17](#)):

They were taller than their mountain cousins to create larger spans between towers and their lighter materials reflected the relatively mild environmental conditions of the valley. The mountain towers stretched from the caribou powerhouse through the rugged terrain of the Feather River Canyon balanced along the steep rocky walls of the canyon

Speaker 1 ([16:37](#)):

Blueprints for a mountain tower showing its various separated components.

Speaker 2 ([16:42](#)):

They were short and bulky and designed to withstand variable weather conditions. The construction of the stairway of power in the first half of the 20th century was not easy. Workers overcame challenges with the terrain, lack of infrastructure in the early years to move people and materials and extreme weather, including snow and freezing conditions in the mountains. Two companies were responsible for the expansion of the stairway,

Speaker 1 ([17:10](#)):

A cartoon of the stairway with the title, great Western Power is a million manpower,

Speaker 2 ([17:16](#)):

Great Western Power Company and pg and e. After decades of competing with the smaller company pg e acquired Great Western in 1930, pg e had originated in the mid 19th century as the San Francisco Gas Company and was incorporated in 1905. The company already owned several hydroelectric plants at this time, but a 60% increase in the state's population from 1900 to 1910 added pressure for more and more power. PG e's acquisition of the Great Western Power Company eliminated one of its primary rivals in hydroelectric power generation.

Speaker 1 ([17:58](#)):

A newspaper clipping titled Great Western Power and Pacific Gas Systems Linked

Speaker 2 ([18:04](#)):

And pg e became the new owner of the burgeoning Stairway of Power. California's utility system expanded rapidly after World War ii when the state experienced sustained, but intense growth in its industrial manufacturing and agricultural sectors as well as in its population. From 1946 to 1952, pg and e invested nearly a billion dollars in new system facilities, including large hydroelectric projects, steam generation plants, and intricate transmission networks across the state. PG and e looked to expand the stairway of power as well. The company added powerhouses, dams, and reservoirs along the Feather River Canyon, requiring the construction of new tunnels, penstocks, and other features that funneled water through the canyon to the powerhouses. Each set of new facilities added another step to the mighty stairway of power,

Speaker 1 ([19:03](#)):

A black and white historical photo of two construction workers standing inside a massive tunnel

Speaker 2 ([19:08](#)):

Far up in the canyon above the caribou powerhouse. Pg e completed the butt Valley powerhouse in 1958.

Speaker 1 ([19:16](#)):

A map depicting where the butt valley powerhouse is compared to the caribou powerhouse

Speaker 2 ([19:21](#)):

At the Valley Reservoir, which had been completed a few decades before Below, but Valley and Caribou sits Belden powerhouse then Bucks Creek Powerhouse. The 1950 Rock Creek Reservoir Dam and Powerhouse are just below Bucks Creek. The next step in the stairway is Cresta Powerhouse, which sits four miles below the Cresta Reservoir and dam. Below this. The 1953 Poe Powerhouse generates electricity with water from Poe Reservoir and Dam pg and e expanded the existing facilities along the stairway as well. Situated next to Caribou Powerhouse number one, caribou powerhouse number two opened in 1958 to further increase generating capacity. Pg e's expansion of the stairway was accomplished by the workers who lived in the Canyon and carried out the construction, maintenance and operations of the stairway,

Speaker 1 ([20:17](#)):

A black and white historical photo of two construction workers digging through a small tunnel.

Speaker 2 ([20:23](#)):

These tight-knit communities included Las Plumas, a town established in the early 20th century on the opposite side of the river from the Big Ben powerhouse. Although isolated, the town offered residents amenities like a post office school, hospital, theater, and social club. Another worker settlement Caribou Camp was built near Caribou powerhouse in the early 20th century and still stands today. In 1968, a significant new step was added to the stairway of power, the Oroville Dam. The dam was built by the California Department of Water Resources as a part of the state water project, which established the statewide water system at 770 feet. The earth fill and embankment dam remains the tallest such structure in the United States. The dam created the enormous Lake Oroville, which submerged the Big Bend powerhouse and the town of Los Plumas.

Speaker 1 ([21:18](#)):

A map showing how the landscape was changed when the Oroville Dam was built

Speaker 2 ([21:23](#)):

To accommodate the significant new system, pg and e rerouted the caribou transmission line to a new substation and built Belden powerhouse situated two miles above the Rock Creek facilities,

Speaker 1 ([21:36](#)):

A map showing where the Belden powerhouse is along the Feather River.

Speaker 2 ([21:40](#)):

As a result of these post-war changes, pg e incorporated the Caribou big band transmission line into an increasingly complex and dense network of energy generation, transmission, and distribution. The historical tower alignments included parts of 11 individual lines that could operate largely independent of each other. PG and e has retooled the Feather river generation and transmission system over time to continue to develop and improve the steps in the stairway of power and to power towns from Palermo to Valona to keep the power flowing. Components of the stairway needed to be replaced or upgraded over time.

Speaker 1 ([22:18](#)):

A black and white historical photo of two men welding on a pipe

Speaker 2 ([22:23](#)):

Even before the construction of the stairway of power. The electrical infrastructure in California was in a constant state of renewal. Pg e continuously updated components of its electrical systems upgraded and improved existing power plants added to substations and rebuilt and expanded transmission and distribution lines. Many changes within the stairway were required due to erosion, environmental damage and the development of new roadways. Pg and e has modified towers, increased the height of lines to provide more traffic clearance and relocated towers due to shifts in the Yuba River and the construction of the Travis Air Force base in Solano County. The company has also decommissioned sub substations when no longer needed due to other system improvements. Safety work system inspections and vegetation management are all part of the pg and e maintenance routine today to continue to provide safe services while reducing risks of outages and wildfires.



Speaker 1 ([23:24](#)):

A pig and an employee being lifted by a helicopter after finishing a repair.

Speaker 2 ([23:30](#)):

This is particularly important as climate change has increased the risk and occurrence of wildfires in California today. Efforts are underway to install stronger poles and covered power lines and to move lines in high fire threat areas underground, including in the Canyon following the campfire. In 2018, the Caribou Palermo transmission line and the stairway of power was taken out of service and dismantled. Despite modern developments, native Americans have continued to nurture strong ties to the Feather River Canyon, the Maidu Summit Consortium, which is made up of several native groups in the mountain. Maidu Homelands is involved in many projects to preserve the area's natural landscape and wildlife.

Speaker 3 ([24:16](#)):

So first of all, it's just a way of thinking and a way of conceptualizing how we are in the world and what our relationship is with each and every species. That depends on the Feather river, be it riparian species or upland species. They all depend on that water system. The development of the stairway of power in and near the Feather River Canyon significantly impacted the Maidu communities in a multitude of ways. And beginning with just the displacement of people from their homes, from the places that they were born at where they had loved ones buried at, those things were changed and submerged, and then it changed the species. And so the analogous species were no longer able to come into those systems, and that affected the stories and the ceremonies and the songs and even healing. And so when you have species not coming into the system and you stop singing those songs, partly because they're not there, partly because your children are being sent to boarding school and you have no one to teach it to, it significantly impacts it.

Speaker 3 ([25:38](#)):

We are in conversations right now with the California Department of Fish and Wildlife about becoming a pilot Beaver Relocation project, and we've partnered with US Fish and Wildlife to restore the wetlands and the meadow systems on our largest property. And so that's very significant to us as well, really looking at the maintenance of cultural fire and other things prescribed fire even to maintain those systems, to strengthen our communities and keep them safer as well. Having the youth involved in every project is so important. And at the same time, again, we don't have that capacity. And so we really want to focus on workforce development programs and youth programs. And I was on a project earlier today and there was a young man, a recent graduate from high school, and when he got out on this project and started working, he just lit up. His whole life has changed, and it's exciting to witness that.

Speaker 3 ([26:44](#)):

And then a couple of the other young men were like, yeah, when we started doing this, we were kind of going down the wrong road, not making some good decisions, and we didn't know there was anything different when we started. We got out there in the water or working on different projects. We love this. This is what we want to do for the rest of our lives. And it's such a huge investment into our youth because they are our next leaders. And to be able to share even a little bit with them means everything. And if we can build beyond just sharing a little bit, but really engage them and create that pathway for them to learn, I think all of our communities will be better. And with that in mind, one of my other goals has been to build a Maidu Institute of Ecology, and that wraps everything into that process of teaching

people to think different, conceptualizing. That's not just water running down a creek, it's a ceremony, it's laughter, it's a song, it's power. It feeds so many things, and so it really impacts so many human and non-human communities on that pathway.

Speaker 2 ([28:09](#)):

The efforts of groups like the Maidu Summit Consortium demonstrate the important connections between the natural landscape, human history, and daily life. The power of the Feather River has been harnessed by Californians over the last century to build towns, cities, and livelihoods of all kinds. The stairway of power is the product of major Hydroelectrical innovation that began in the 1910s and 1920s. By 1955, pg and e provided power to 46 of the state's, 58 counties. Today, the company serves more than 16 million Californians while the Feather River formed the Canyon and fed surrounding communities. For thousands of years, modern human developments in and around the Canyon have continued to reshape the landscape to meet the evolving needs of people and industries in California,

Speaker 1 ([29:02](#)):

An aerial view of the Oroville Dam.

Speaker 2 ([29:05](#)):

While many may not know it, much of this change has been powered by the clear waters of the Feather River as it winds its way through a complex landscape that has sustained numerous groups of people who have thrived in the mountains of the Sierra Nevada for thousands of years.

Speaker 1 ([29:24](#)):

A title screen that reads an I C F International Inc. Short documentary produced by Pacific Gas and Electric Company, stairway of Power, reshaping, nature Connecting Communities, narration by Maureen McCoy, videography by Kainoa, little script by McCoy. And John Rush.