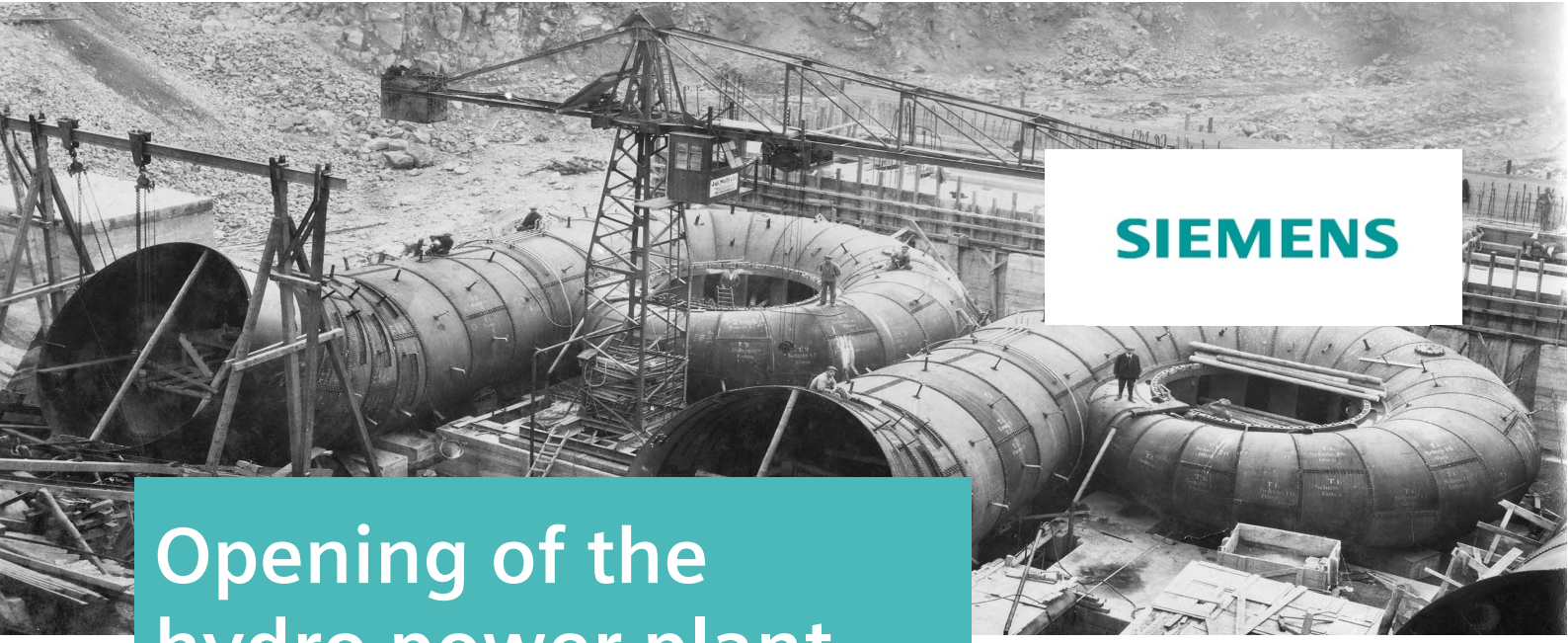


# Opening of the hydro power plant on the Shannon

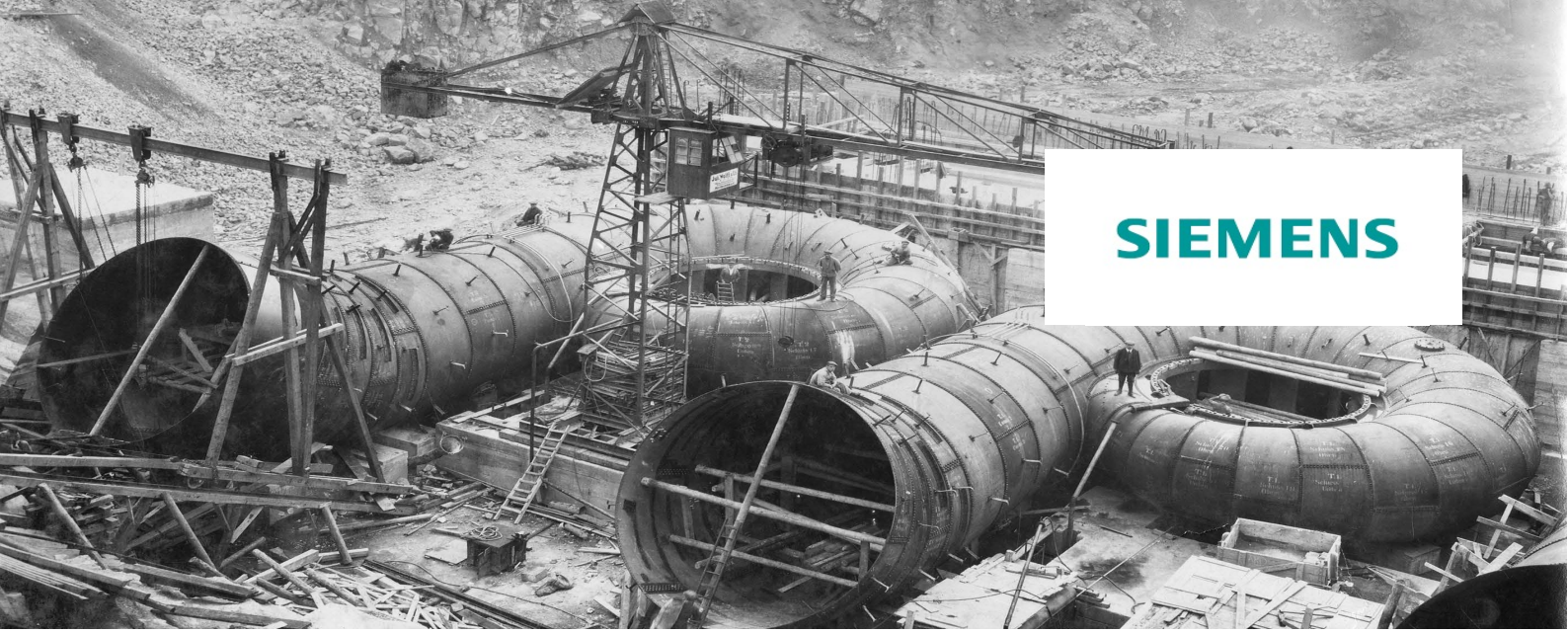
July 22, 1929

**Ireland was almost "untouched by electric power" in the early 1920's outside of a few larger cities such as Dublin and Cork. The total capacity of all public electric plants was around 27,000 kilowatts (kW). The Free State (now the Republic of Ireland) had almost no coal deposits, so the ambition was to use domestic water power for electrification and economic development of the country. Back then, some three million people lived in the area that was to be supplied with power, which, at 70,000 square kilometers, was about the size of Bavaria.**

The idea of harnessing the energy from the lower part of the River Shannon, with its steep fall, originated with Thomas McLaughlin, an Irish physicist and electrical engineer who had worked at Siemens-Schuckertwerke (SSW) in Berlin starting in late 1922. With the support of hydroelectric power experts from Siemens, he convinced the Irish government that the project was technically and economically feasible. The initial talks between Siemens and government representatives of the Irish Free State began in early 1924, and the German electrical engineering company was asked to prepare proposals on power generation and distribution.

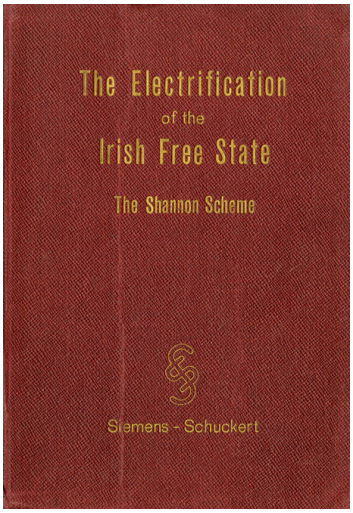
General view of the Ardnacrusha hydroelectric power plant on the Shannon, 1929

Thomas Anthony McLaughlin, undated



Siemens submitted a comprehensive project plan on October 1, 1924. The 358-page document contained technical specifications and a binding offer, including a detailed cost calculation based on carefully developed water management plans. After a thorough examination by international experts, the draft was slightly revised and submitted to the Parliament in Dublin for approval. The government laid the legislative foundation for completion of the ambitious project when it adopted the Shannon Electricity Act in July 1925. The first “Shannon contract” was signed one month later, on August 13, 1925. The general contractor and supplier of the electrical equipment was Siemens-Schuckwertwerke.

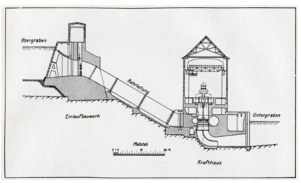
A weir for the power generation system was built near Killaloe, raising the level of the Shannon by 10 meters. Dams to retain the planned reservoir were to be built above the weir on the right and left sides of the river. A navigable canal (headrace) 12.5 kilometers long branched off from the weir, carrying the water to the powerhouse near Ardnacrusha. The powerhouse adjoined a two-kilometer-long tailrace canal to return the water to the Shannon above Limerick. The maximum fall between the headrace and the tailrace was 34 meters.



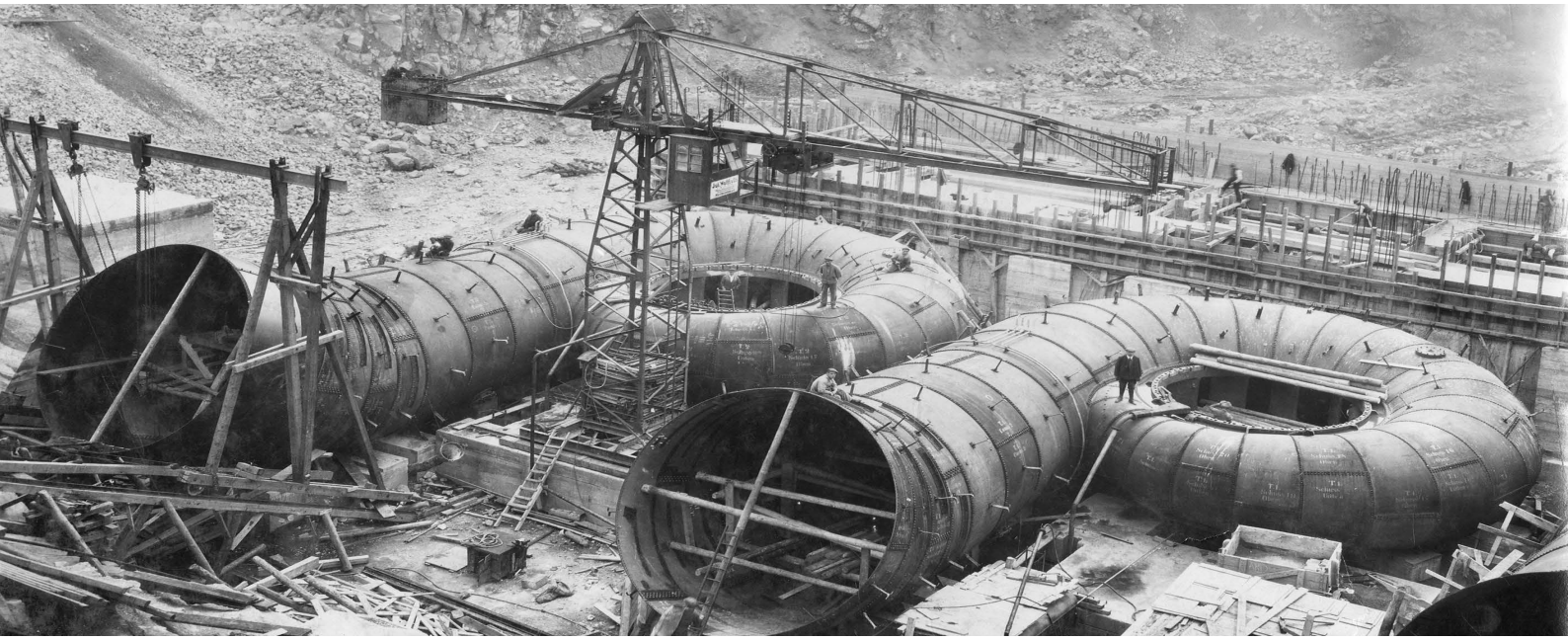

Cover of the project description, 1924

Site plan of the power generation system

The river water flowed through iron pipelines six meters in diameter to turbines in the powerhouse, which converted the flow energy into rotation energy and drove the generators. The electricity they produced was distributed to the country’s long-distance lines through switchgear and transformer stations.



Cross-section of the powerhouse (from left to right): intake, pipeline, and powerhouse



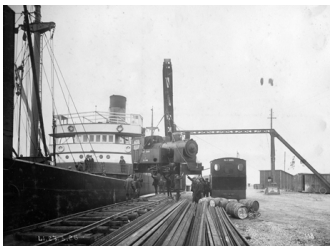
Completion of the Shannon Scheme was a major organizational and technical challenge for everyone concerned. This was particularly true for the civil engineering work – handled by the subsidiary Siemens-Bauunion (SBU) – which began immediately after the contract was awarded. A total of about 8 million metric tons of earth was excavated and used in the dams, and almost 1.2 million cubic meters of rock was blasted and carried away.

Ireland had no construction industry worthy of the name, most of the machines and equipment – about 30,000 metric tons of construction machinery and equipment alone – had to be brought from Germany to Ireland in chartered steamships. The electricity needed to operate all of the equipment was generated by the company's construction power plant, which had a total capacity of 4,200 horsepower

The damp climate of Ireland, problematic ground conditions, and geological formations whose pitfalls had not been recognized when doing the preliminary soil tests and sample drilling slowed the progress of the civil engineering work. Another complicating factor was that many of the approximately 3,500 local workers, hired at the request of the government, had little experience with civil engineering work.

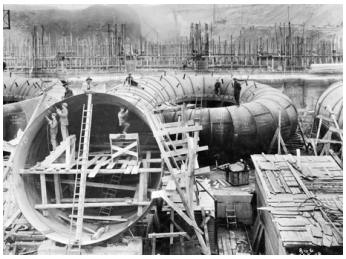
The Shannon Scheme was completed in phases; Siemens installed three turbines, three rotary current generators, and three transformers during the initial phase. Assembly of the three 38,600-HP vertical-shaft Francis spiral turbines, each connected to a rotary current generator with a capacity of 30 MVA, began in 1928

The powerhouse construction site in summer 1926

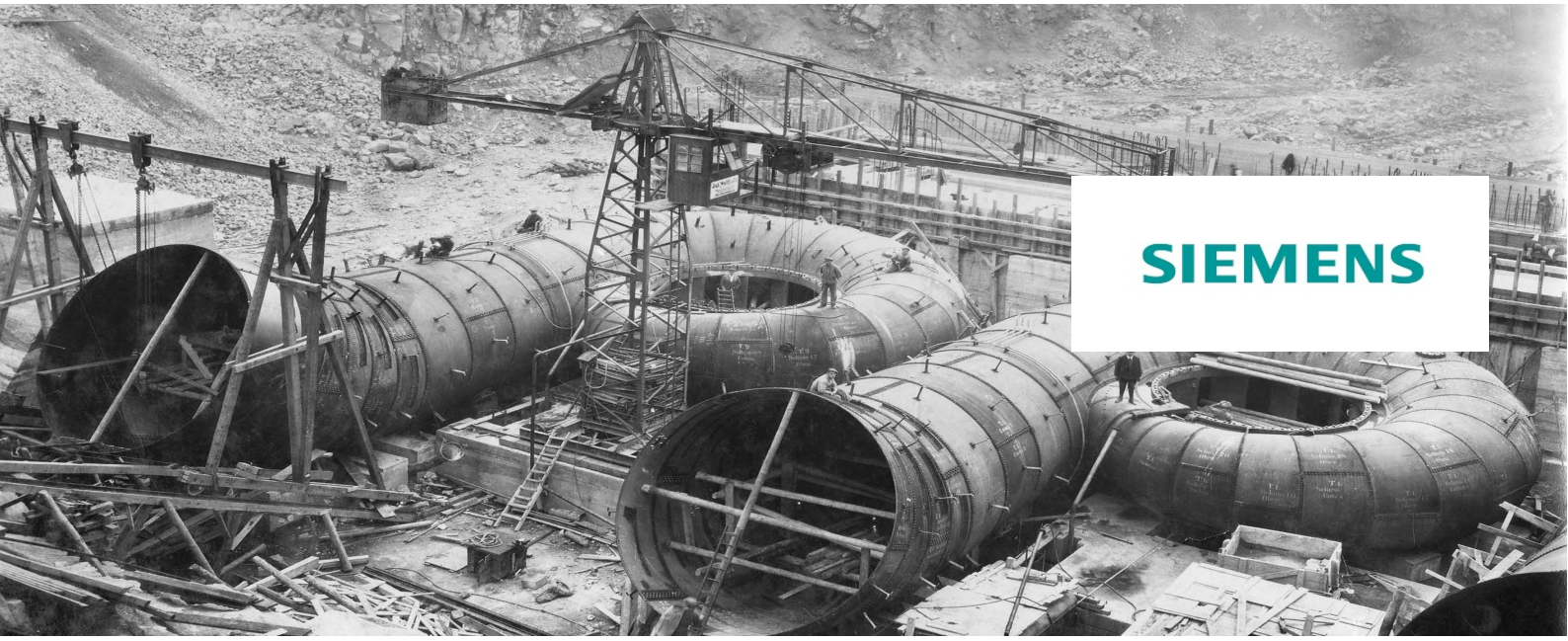


Unloading one of the 130 steam locomotives used during the construction work, 1926

Excavation, rock removal, 1927



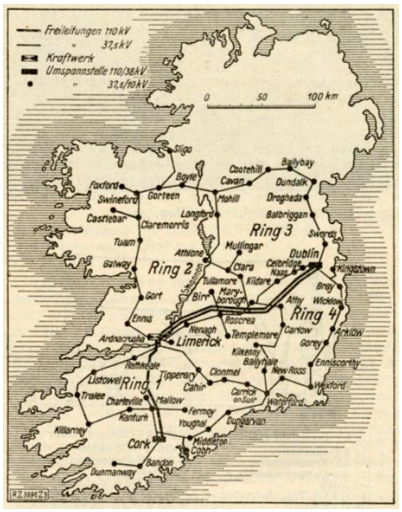
Powerhouse, assembly of the spiral casings for turbine II, 1928



The powerhouse – the heart of the entire system – included the generator hall, the 38-kV distribution station, and the 10-kV distribution station. This is where power was transformed into 110 or 37.5 kV. Adjoining the generator hall were rooms for transformers; workshops to repair generators, turbines, and other machines; and storage areas. The most important parts of the system were commissioned on October 17, 1929.

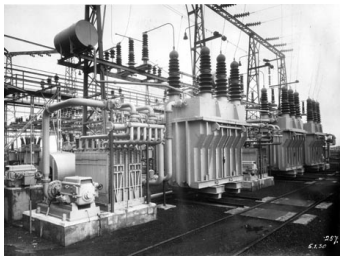
View of the generator hall, 1929

The entire Irish Free State was supplied with electricity from the Shannon over a power grid for 110 kV, 37.5 kV, and 10 kV having a total length of 3,400 kilometers and numerous distribution stations and transformer stations




High-voltage network in the Irish Free State, 1930

The long-distance lines to the two largest Irish cities, the capital Dublin and the port city of Cork, were about 185 and 96 kilometers long. Those cities naturally used the most electricity and also served as the feed-in point for the extended medium-voltage distribution network. A 110-kV double line was installed to supply Dublin, while Cork was connected to the generating station by a 110-kV single line.



Outdoor transformer station, Inchicore near Dublin, 1930