Present day
Europe – 1895
The Austro-Hungarian Monarchy
Franz Joseph I (1830-1916)  
Emperor of Austria, King of Hungary

- Franz Joseph I (German)  
- I. Ferenc József (Hungarian)  
- Franjo Josip I (Croatian)  
- Francis Joseph I (English)  
- ruled from 1848-1916  
- his 68-year reign is the third-longest in the recorded history of Europe
Imperial Easter Tour of Dalmatia
April 1875

- Split
- Dubrovnik
- Zadar
- Šibenik
- Smiljan

Adriatic Sea
Šibenik

Ante Šupuk
Mayor of Šibenik

Vjekoslav Meichsner
Šibenik City “Ingenieur”
Šibenik City Hall
1882 – New York

- Edison builds a first DC network – Electric lights in New York

1883 – 1890 in Croatia

- 10 DC power plants built
- 9 thermal, 1 hydro
- Rijeka (1885) – sixth theater in the world connected to a power grid (New York, London, Paris, Milan, Vienna, Rijeka)
War of Currents - 1880’s

- Thomas Edison
- Nikola Tesla
- George Westinghouse
- DC
- AC
At an AIEE meeting on May 16, 1888, Nikola Tesla delivered a lecture entitled A New System of Alternating Current Motors and Transformers, describing the equipment which allowed efficient generation and use of alternating currents...
1891 – Frankfurt Exhibition

- first long-distance AC transmission
- 175 km from Laufen to Frankfurt
- Marko Šupuk attended the exhibition
Tesla’s address at Zagreb City Hall

- In May 1892 Nikola Tesla delivers a lecture in Zagreb City Hall trying to convince the City of Zagreb to start building an AC power plant.

- At the same time the construction of the AC power system in Šibenik had already begun.
Šibenik – the beginning

- Šupuk and Meichsner contact Ganz
- Ganz agrees to build an "experimental system" in Šibenik
- the system would consist of
  - hydro power plant
  - transformers
  - transmission line
  - distribution network
  - meters and other equipment
Preparation

- Ganz sends top experts to Šibenik (including Zipernowsky, Deri, Blathy, Zerial, Zorzenoni); however, the entire production remains under control of Meichsner and Šupuk.

- Ettore Zorzenoni remained in Šibenik as chief technical officer of the power plant after it was built.

  - Karoly Zipernowsky – transformers
  - Miksa Deri – circuit-breakers
  - Otto Titusz Blathy – watt-meter
Construction begins

- after months of detailed preparation
  the construction of Šibenik’s first
  power plant begins in 1884 at the
  location called Jaruga

- building permit obtained

- a concession for placing power poles
  on the county land is obtained

- at approximately the same time G. Westinghouse
  begins building the Niagara Falls plant
Krka Power Plant
Jaruga 1
Power plant

- Girard turbines (vertical) – 320 HP
- Ganz 2-phase generators (horizontal) (Zipernowsky alternators, type A2) 315 1/min, 320 HP, 3000 V, 42 Hz
- manual water regulation
- manual voltage regulation
- simple protection: circuit breakers and over-voltage “horns”
Transmission lines

- 3000V, 11 km, 360 poles
- 35 and 50 mm² conductors
- bottle shaped, oil-filled glass insulators
- telephone line
Transformers

- 6× 3000/110 V (Zipernowsky)
- 5 transformers were located on roofs
- 1 in a stand-alone transforming station
Street lamps
Street lamps
Lamps – detail
Ganz (Jablockov type)
– electric carbon arc lamps
28 August 1895

- Electric power delivered to Šibenik
- 324 electric lamps illuminate Šibenik on the first night

- Niagara Falls power plant opened two days before Jaruga, supplying the nearby aluminum factory; power delivery to Buffalo begun one year later
1904 – Jaruga 1 and Jaruga 2
1903 – Jaruga 2

- Ganz
- Francis turbine 3500 HP (later two)
- 2-phase generator 2625 kVA, 15000 V, 42 Hz (later 2×2625 = 5250 kVA)
- new 12 km line, 4×50 mm² Cu (2× 2-phase) to a large factory in Crnica (Šibenik), 360 poles
- transforming station 15000/6000/3000 V
- paralel operation with Jaruga 1
1906 – HPP Manojlovac (Miljacka)

- third HPP in Šibenik
- first on a 3-phase system
- 4 horizontal Francis turbines (6000 HP)
- 4×5200 kVA, 30000 V, 42 Hz
- 35 km 30 kV line, 2×3×62 mm² Cu

- Jaruga 1 and Jaruga 2 reconstructed for 3-phase systems, all plants interconnected into a single power system
Šupuk family legacy

- Marko Šupuk died in 1903
- Ante Šupuk died in 1904 (Mayor for 28 consecutive years)
- Šupuk and Meichsner built a city water supply, brought railway to Šibenik, built a County Courthouse, a High school, pavilion type hospital (first and biggest in Austria-Hungary)
1914 – Jaruga 1 disassembled

- Austrian army takes over all three power plants in Šibenik
- they close down Jaruga 1, move all usable parts to Jaruga 2, and use 15 tons of copper for bullets
- Jaruga 1 was never reconstructed
- Jaruga 2 is still in operation
International associations

- Šupuk&Son Electric Company was one of the six founders of EURELECTRIC (1925)
- Šupuk&Son Electric Company was also involved with the foundation of Cigre (1921)