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Electrical Power: Its Advent and Role in Revitalizing and Expanding New Orleans 1880-1915

A Thesis

Submitted to the Graduate Faculty of the
University of the University of New Orleans
in partial fulfillment of the
requirements for the degree of

Master of Arts
In
History

By

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B.S., University of New Orleans, 1962
Ph.D., Louisiana State University, 1965
December, 2016

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Abstract

New Orleans in 1900 was an endangered city clinging to a narrow strip of relatively high ground along the lower Mississippi river. Frequent flooding occurred from the river in the spring and from the lake in the June to October hurricane season. No reliable source of drinking water and no systems for removal of sewerage and rain water existed. Disease mortality was very high especially from frequent outbreaks of yellow fever.

The fortuitous appearance of new alternating current (AC) technologies, emerging engineering specialties, and a more progressive form of governance willing to support and finance large scale engineering projects , by 1910, gave New Orleans world class drainage sewerage, and potable water systems. With electric streetcars providing service to newly drained areas and greatly reduced disease mortality, New Orleans entered the twentieth century transformed into a safe and expanding city.

Kew Words: Electricity, New Orleans, Infrastructure

Introduction

This study is focused on the previously unrecognized critical role that the AC electrical systems developed by George Westinghouse and Nicola Tesla played in the timing and overall success of the great infrastructure projects in New Orleans at the turn of the twentieth century.

The United States experienced tremendous growth in its population and industrial might in the period 1870-1910. Massive political upheaval accompanied the population growth and technological revolution drove the industrial growth. Waves of immigration, first from western and then from eastern and southern Europe and finally from Asia, brought in millions of eager immigrants to work in rapidly expanding industrial complexes and railroad building. The frontier reached the Pacific coast and then doubled back to transform the vast plains between the Mississippi and the Rockies into the agricultural heartland of America. The railroads reached into almost every nook and cranny of the land moving immigrants to industrial centers like Chicago and Cleveland and beyond to the plains carrying the industrial and agricultural produce from the West and Midwest to the rapidly growing eastern cities. The railroads themselves significant drivers of industrialization required enormous quantities of steel rails, locomotives, and rolling stock as well as needing vast amounts of coal for fueling trains. The railroads linked the growing cities accelerating rapid urbanization. The book *The Urbanization of America* by Blake McKelvey describes the growth of cities and the unique institutions created in them and how they shaped the country.[1]

The lives of the people of the United States became increasingly chaotic in the period after the Civil War. Rapid industrialization, massive immigration, and the crowding of the populace into expanding urban areas changed the lives and values of the people in ways unimaginable to previous generations. The efforts of the people to escape this chaos is described by Robert Wiebe

[1] Blake McKelvey, *The Urbanization of America 1860-1915* (New Brunswick, Rutgers University Press, 1963).

in his book, *The Search for Order, 1877-1920*, as a "fundamental shift in American values, from those of a small town in the 1880's to those of new, bureaucratic-minded middle class by 1920."[2] The growth of the universities in providing advanced education in fields such as medicine, law, finance, management, and engineering provided expertise in the fields studied but also a growing middle class interested in governmental reform. Reform movements developed from a general revulsion at the corruption associated with the big city machines. These movements came to be known as Progressivism which was concerned with much more than fighting corruption. There was a strong move to incorporate the advanced expertise of the emerging professions into providing improvements in the lives of the people. This manifested itself in the creation of governmental entities controlled by professionals in the field. A prime example is the creation of Boards of Health that regulated areas such as quarantines and sanitation.

In the area of finance Americans began to wrest control of capital markets from the English and use their power to consolidate businesses such as the railroads toward monopolistic systems. Ron Chernow describes the rise of the Morgan banking empire from a subsidiary of a mid-size English Banking house to a world power functioning much like a central bank.[3] Morgan was heavily involved in financing the growth of monopolistic entities in railroads, steel, chemicals, and electrical power. General Electric, a child of JPMorgan, figures in the story of electric power in New Orleans.

In the last quarter of the century the age of electricity blossomed, overshadowing the previous age of steam. In the early 1880's, street lighting arrived as the first manifestation of commercial direct current (DC) electric power and became ubiquitous in the cities within a few years. The advent of electrified streetcars began in the next decade, and by 1900 existing car

[2] Robert Wiebe, *The Search for Order 1877-1920* (New York: Hill and Wang, 1967).
[3] Ron Chernow, *The House of Morgan: An American Banking Dynasty and the Rise of Modern Finance* (New York: Grove Press, 1998).

lines were electrified country wide. New lines rapidly grew out from city centers initiating the suburbanization of America on a large scale.

The growing cities faced ever increasing demand for expanded services including access to the new technologies such as electric lighting, electrified streetcars and telephones as well as the more traditional utilities; potable water, sewerage and drainage. Charles Glaab[4] describes the conflicts resulting from dealing with the monopolistic powers regarding provision of municipal services. The Progressive ideal of public utilities was strongly opposed by the increasingly powerful corporations and this resulted in a hodge-podge of shifting ownerships across the country.

Another revolution in electrical technology began in the last decade of the century and involved the emergence of Westinghouse/Tesla alternating current (AC) systems that allowed for the development of central power plants serving large areas and ultimately the whole country and the world. Tesla invented large multi-phase motors that made possible the electrification of heavy industries. Jill Jonnes, in her book *Empires of Light,* tells the fascinating story of the work of Westinghouse and Tesla and their battles with Edison for the control of electrical power generation and distribution.[5] AC systems had a very unique impact on the fortunes of New Orleans.

Generally, development was slower in New Orleans and Louisiana as it was in other states that joined the confederacy. The Civil War and the Reconstruction period devastated a mainly slave-based agricultural system and did not provide for anything to take its place. The former slaves managed to gain some political power but that power did not survive the departure of the

3 Charles Glaab, *The American City- A Documentary History* (Homewood, IL: Dorsey Press, 1967).
[5] Jill Jonnes, .*Empires of Light: Edison, Tesla, Westinghouse, and the Race to Electrify the World* (New York: Random House, 2003).

army at the end of Reconstruction. By 1900 black people were disenfranchised throughout the South and subservient again to whites. This continued more than fifty years before African-Americans gained significant political power in New Orleans and elsewhere.

In other ways, however, New Orleans differed from the rest of the South. In 1895, New Orleans, the largest city in the south, stood at the mouth of the largest river and drainage area in the country. Trade from the Mississippi River Valley to the rest of the world was the main business of New Orleans, and it was always much less dependent on the old plantation system than the rest of the South. The city's recovery from the devastation of the Civil War was nearly complete. The construction of the Ead's jetties at the mouth of the river in 1878 opened the port to large modern ships then coming into use. Port tonnage increased beyond prewar volumes. Electric lights powered by DC came to the city in 1882 followed by a great world's fair hosted in 1884-1885 (a technical and esthetic if not financial success). The city streetcars electrified (also with DC power) starting in 1893 but New Orleans' geographic situation limited its suburban growth more than most other cities. The city had no effective sewerage or drainage systems and lacked a safe and reliable source of drinking water. Over the years, the city initiated many projects, both large and small to solve these problems but accomplished little. Diseases such as yellow fever and cholera continued to ravage the population. The drainage problems forced most residents of the city to live on a narrow strip of relatively higher ground along the river. The adverse geography worked against the city

New Orleans was one of the few places in the South that saw significant immigration in the latter part of the nineteenth century. This resulted in government forms similar to the northern states and a very effective machine (the "Choctaw Club") became a potent force in New Orleans politics for over fifty years. New Orleans also had a large commercial and banking community as

well as an elite university (Tulane) and these resulted in a strong Progressive movement in the city and state. The Choctaws and the Progressives were natural enemies and the electoral process was an exciting one as the parties swapped offices over the period. However, this being New Orleans, the politics were a great deal more complicated.

Machine politicians mostly controlled New Orleans city government. However, Progressive ideas strongly permeated the system. Key constructs such as the movement to turn over important governmental functions to non-governmental agencies run by professional engineers and managers were easily adopted. Richard Haas in his book, *Political Leadership and a Southern City* remarked how readily important members of the reformist Citizen's League moved into the ranks of the Choctaw Club after the 1896 Constitution disenfranchised most of the Blacks who had been key League supporters. [6] Robert Dupont in his dissertation "Progressive Civic Development and Political Conflict: Regular Democrats and Reformers in New Orleans, 1896-1912" discusses the several boards and commissions created by the city in the period and the reforms and projects that were accomplished by these entities.[7]Of these the Board of Liquidation, City Debt and the Drainage Board and its successor, the Sewerage and Water Board became major players and driving forces for the drainage, sewerage and water projects that transformed New Orleans. The former provided the needed financing and the latter the engineering and managerial expertise that made the projects possible. The City through its independent boards designed; financed, and built the infrastructure it so desperately needed utilizing the newly developed AC technology to accomplish it.

[6] Edward F. Haas, *Political Leadership in a Southern City: New Orleans in the Progressive Era 1896-1902* (Ruston: McGinty Publications, 1988).
[7] Dupont, Robert L. "Progressive Civic Development and Political Conflict: Regular Democrats and Reformers in New Orleans, 1896-1912." Ph. D. diss., Louisiana State University, 1999.

The Origins and Development of Electric Power

Mankind observed and described electrical phenomena from the dawn of civilization. However, understanding of such phenomena did not develop until the middle of the eighteenth century when Benjamin Franklin demonstrated that lightning and static-induced charges were examples of the same force, albeit at vastly different power levels.[8] The invention of a practical battery by Volta in 1800 provided a constant source of DC power which spurred the creation of lighting systems, alarm systems, the telegraph and telephone, and the electroplating industry.[9] The first lighting systems were based on arc lamps,[10] first demonstrated by Humphrey Davy in 1812 and commercialized with battery power in the 1850's.[11]

The major scientific discoveries that eventually led to practical power generation came after Michael Faraday discovered the fundamental relationships between electricity, magnetism, and motion and built the first electric generator/motor in 1831.[12] Despite the efforts of many inventors and scientists, commercial DC electric generators did not appear until the late 1870's. Companies quickly adapted these new generators to powering arc lights, and this practice spread rapidly, first in Europe and then the United States.

As with many emerging technologies, the beginnings of electrification in the United States were chaotic with many different ideas competing for consumers. Thomas Edison first demonstrated his light bulb in December 1879 at his lab in Menlo Park, New Jersey. Reacting in New Orleans the Picayune did not think that there was much potential for practical applications

[8] Jonnes, *Empires of Light*, 26.
[9] Michael Schiffer, *Power Struggles: Scientific Authority and the Creation of Practical Electricity before Edison* (Cambridge: MIT Press 2008), 13.
[10] An arc lamp generates light from a spark across the gap between two carbon electrodes, much like an automobile spark plug.
[11] Schiffer, *Power Struggles*, 18.
[12] Schiffer, *Power Struggles*, 51.
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and remarked when reporting new Edison patents that "he had more patents than lights."[13] Undeterred, Edison brought his first commercial power station into operation on September 4, 1882 in lower Manhattan.[14] Competitor Charles Brush demonstrated an electric arc light in Cleveland in 1879 and built a dynamo and lighting system for Monumental Park in Cleveland that came on line in April 1879.[15] Brush also operated in New York, installing 17 large arc lights on Broadway between Union Square and 34th St. in December, 1880. The effect was so dramatic that Broadway was called the "Great White Way," a term still in use to the present day.[16] Broadway in the Times Square area remains undoubtedly the most brilliantly lighted area in the United States. Brush systems operated in Boston, Philadelphia, Montreal, Buffalo, and San Francisco as well as New York by the end of 1881.[17] However, the Edison bulb was a far superior technology and used in the smallest to the largest installations. Arc lights, because of their extreme intensity were only used in large spaces and, even when used as street lights, were mounted high in the air. Edison rapidly expanded and displaced arc installations with incandescent bulbs. Movement into residential areas was much slower due to the relative expense and complexity of wiring each individual house and connecting it to a power station.

The next great application of DC electric power was in transportation. Development of electrical powered trolley cars was contemporaneous with lighting systems and several different systems built as demonstrations included two at the New Orleans Cotton Expo in 1884. However, it was not until 1887 that Frank Sprague was able to build a complete, efficient system in Richmond, Virginia. General Electric moved in quickly to buy out Sprague and within three

[13] *New Orleans Daily Picayune*, January 7, 1880, May 19,1880.
[14] "The Inventions of Thomas Edison," (About.Com: Inventions), http://inventors.about.com/od/famousinventions/fl/Thomas-Edisons-Greatest-Inventions.htm, accessed October 28, 2016.
[15] Jeffrey La Favre, "Charles Brush and the Arc Light," www.**lafavre**.us/**brush**/**brush**bio.htm, accessed October 28, 2016. Brush had started with his first dynamo in 1876 that was one horse power (literally).
[16] Jonnes, *Empires of Light*, 2003,75,81.
[17] Jeffrey La Favre, ibid.

years some two hundred cities built or ordered systems based on the Sprague streetcar technology.[18] Electric trolleys rapidly replaced and extended previous horse drawn systems. In the United States by 1893 there was a total of twelve thousand miles of track of which sixty percent was electrified. At the end of 1903 track mileage increased to thirty thousand miles and was ninety-eight percent electrified.[19]

New York built a large subway system that ran both below and elevated above ground and utilized slightly different technology from trolley cars. The three rail system was more efficient and reliable but was not good for street level systems because of the danger to pedestrians. This system was very capital intensive but because it did not compete with automobiles for street space, it continued functioning and has continued expanding even to this day, unlike the trolley lines which mostly disappeared.[20]

A significant technological shift in the industry started around 1883 with the inventions of George Westinghouse and his brilliant engineer, Nikola Tesla, who developed AC generators, distribution systems, and motors. This system allowed for the transmission of large amounts of electric power over long distances, and it developed into and remains the basis for the expanding power grid that electrified the country and the world. The multi-phase motor which allows AC power to directly provide a uni-directional rotation to a motor was the key new element, and it allowed for the construction and use of electric motors in innumerable applications from fractions of a horsepower to many thousands.

[18] David Nye, *Electrifying America: Social Meanings of a New Technology 1880-1940* (Cambridge: MIT Press 1992), 89.
[19] Kenneth Jackson, *Crabgrass Frontier: The Suburbanization of the United States* (New York: Oxford University Press, 1985), 111.
[20] Clifton Hood, *722 Miles: The Building of the Subways and How They Transformed New York* (Baltimore: The Johns Hopkins University Press, 2004).

Westinghouse began installing his AC systems nationwide. By 1893, Westinghouse managed to beat out General Electric for the lighting contract at the Chicago World's Columbian Exposition, which involved about six times as many lights as the New Orleans Cotton Expo. Westinghouse also obtained the contract for the installation of water- powered generators at Niagara Falls. That installation created an industrial boom in the area and provided power to Buffalo, over twenty-six-miles away. The Niagara Falls project demonstrated two critical systems that led to the electrification of the world. The very large hydro-generators installed at Niagara adapted easily to steam power and perhaps even more important, they served as the basis for very large electrical motors needed by heavy industry. The fact that power could be transmitted over long distances meant that a single large power plant provided electrical service over a wide area. This was a huge cost savings in capital and operating expenses and brought power to heavily built up areas and remote rural areas without the need for multiple power plants at close intervals. The availability of AC systems was critical to the success of the great public works carried out in New Orleans at the turn of the next century.

Thompson-Houston, an arc light competitor based in New England, bought out Brush and Jenney in 1889, and this combined company merged with Edison General Electric to form General Electric in 1892.[21] Although J.P. Morgan was an early backer of Edison and had Edison electrify his Madison Ave. mansion in 1882, Morgan engineered the merger with Thompson-Houston. Thompson took control of the combined company because Thompson-Houston consistently demonstrated a higher level of profitability. This put Edison out of the electric business and left him engaged in full time research at his Menlo Park facility, well-funded by the

[21] John Winthrop Hammond, *Men and Volts The Story of General Electric* (Philadelphia: J.B. Lippincott Co.1941), 123.

buyout of his company. The demise of Edison as a capitalist was in large part due to Edison's refusal to accept that AC systems were superior to DC. Had he continued in charge, this lack of insight would have likely destroyed the company in the end.[22]

The DC systems of Edison and Brush could only provide power to a radius of about one mile from a station and needed several stations to cover an area such as a city. They were not competitive with the Westinghouse AC systems, and General Electric from its formation manufactured AC systems although not paying too much attention to the Westinghouse patents. This resulted in much litigation between General Electric and Westinghouse and ultimately, General Electric knocked Westinghouse out of the business of providing electrical service (again the hand of JP Morgan at work).

Electricity Comes to New Orleans

New Orleanians saw battery-powered DC electric lights as early as 1852 when a showboat advertised them along the approaches to the boat.[23] An article about the christening of a new fire engine included the name of the provider of electric lights for the celebration.[24] A newspaper editorial in 1876 advocated the replacement of gas with electric lighting which was cleaner, less expensive, and provided a deterrent against night time crime.[25]

By 1880, generator powered DC lighting systems were installed at Spanish Fort and at West End making the amusement parks the technology leaders for the city. An editorial indicated the

[22] Jonnes, *Empires of Light* .This book covers this most interesting story in depth.
[23] Daily Picayune, October 15, 1852.
[24] "Electric lights provided by Henry Perry, 141 Poydras St", *Daily Picayune*, November 26, 1874.
[25] *New Orleans Times*, December 29, 1876.

lights were so bright as to deter flirting.[26] [27] [28] Ships equipped with generators and lights appeared in port.[29]

The Southwestern Brush Electric Company, the first commercial electric company chartered in New Orleans, commenced operations January 7, 1882. [30] Brush units installed in a building located on Dryades Street opposite Union Street provided DC power for forty-five 2,000 candle power arc lamps.[31] At least one building interior, Cusach's Drug Store at the corner of Canal and Baronne was lighted in the first installations from Brush.[32]

The advertising for bids on a wharf upgrading contract included a requirement for the contractor to include electric lights as part of the job, showing the cities' willingness to force technology change.[33] The contract for the wharf rehabilitation was let to Joseph Aiken and included lighting a specific portion of the levee and wharves.[34] Mr. Aiken soon came back to the council with a request for relief from the lighting requirement in return for reduced fees, but the council rejected his request.[35]

On January 14, Mr. O'Conner, the Brush Superintendent, announced that wharf and levee lights would be in place in ninety days.[36] By April 1882, Brush commissioned a second power plant powering 104 lights along the river front between Julia and Piety Streets making good on Mr. O'Conner's promise and satisfying Mr. Aiken's contractual obligations to the city. [37] At this time, there were 150 lights in the Brush system which was expanded to twelve generators serving

[26] *Daily Picayune*, April 26, 1880.
[27] *Ibid*, June 3, 1880.
[28] *Ibid*, April 28, 1880.
[29] *Ibid*, August 22, 1880.
[30]Incorporated June 11, 1881
[31] John Meredith, "New Orleans IEEE Section- Celebrating 75 Years," Address to IEEE-NO, August 21, 2008, *Daily Picayune*, January 8, 1882, January 11, 1882.
[32] *Daily Picayune*, January 11, 1882.
[33] *Ibid*, March 31, 1881.
[34] *Ibid*, June 1, 1881.
[35] *Ibid*, October11, 1881.
[36] *Ibid*, January 14, 1882.
[37] *Ibid* April, 7, 1882, This plant was located at Notre Dame and Front Streets

480 arc type street lamps by year's end.[38] Brush also expanded outside its service area with a distributor, H. Dudley Coleman, advertising stand-alone systems including generators, wiring, and lights licensed by Southwestern Brush for installation at large businesses, plantations and others.[39]

Royal Street was electrified in 1883 and the rest of the French Quarter and Central Business District by 1885.[40] The electrification of Royal Street occasioned at least a couple of comments from the *Picayune*. One said that "Ropers" (sort of guides/barkers) were no longer needed to bring prospective customers to the gambling establishments and that "the electric lights on Royal St. allow young men to see something of the world."[41][42] Royal Street then apparently had the role Bourbon Street has now. There were many references to street and building lighting enhancing Mardi Gras parades including a comment on clubs with brightly lit balconies where the patrons threw nickels down to the crowds below.[43] There is no mention of any quid pro quo.

The very bright future of electrical power came to New Orleans in the form of the Cotton Centennial Exposition in 1885. The Exposition showcased all the most modern technologies available and exposed the citizens of the city (and the world) to the electrical future.

[38] "Entergy New Orleans-A Company History" (New Orleans: Entergy Corporation 1996), 1.
[39] *Daily Picayune*, January 31, 1882.
[40] John Smith Kendall, *History of New Orleans* (Chicago: Lewis Publishing Co, 1920), 529.
[41] *Daily Picayune*, January 6 1883
[42] *Ibid*, May 11, 1883.
[43] Ibid, February 18, 1885

World's Industrial and Cotton Centennial Exposition at New Orleans

1884-1885

In the second half of the nineteenth century world's fairs, starting with the great English Crystal Palace exhibit of 1851, came into vogue to showcase the rapidly developing technologies of the era. The Centennial Exposition held in Philadelphia in 1876 included a single electric DC generator powering one arc light and an electric motor driving one pump.[44] By the time of the Southern Exposition in Louisville in April, 1883, electric usage had made several quantum leaps and the exposition's lighting included on the inside 4,600 Edison lamps, and Jenney arc lights on the grounds.[45]

The World's Industrial and Cotton Centennial Exposition opened in New Orleans in December, 1884 and illustrated another quantum leap in demonstrating electrical systems. Although New Orleans had commercial electric power and some street lighting since 1882, the fair included much more lighting than existed in total in the rest of the city and featured much new technology, most impressively, incandescent light bulbs and electrified street cars.

The Cotton Exposition included electric lighting for the fair grounds and the main buildings. These were provided by several vendors. The Main Building contained several steam boilers and had a total of forty dynamos (electrical generators, all DC based) from Brush, Edison, LEL&P, Thompson-Houston,[46] and Daft. The Edison installation had six steam engines driving twelve dynamos supplying 18,000 incandescent lamps in the main and arts buildings. The other power plants provided for arc lighting in buildings, the grounds, and the electrified railways.

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[44] Schiffer, *Power Struggles*, 270.
[45] "*The Filson Newsmagazine*" – (Volume 4, Number 1 - Southern Exposition), September 28, 2007.
[46] *New Orleans Daily Picayune*, Feb 14, 1885.

Two rival companies provided demonstration electric railways.[47] One set up by Leo Daft, founder of the Daft Electric Light Co., used a center third rail for power.[48] The line ran about one-fifth of a mile between the US and Main Buildings powered from a Daft dynamo in the main building that provided its lighting as well. The other, Charles Van Depoele's line, ran about one mile around the grounds, using an overhead trolley system similar to those used in most street car systems.[49]

The Expo provided an immediate boost for electrification and Edison opened for business downtown just after the final closing. Electric streetcars, however, were slow to come and did not appear in New Orleans until 1893.

Continuing Electrification 1885-1893

Brush aggressively expanded in response to both city and private subscriptions for service. [5051] Brush could not keep the market to itself and at least one competitor appeared by 1885. Maurice Hart and his Louisiana Electric Light & Power Company. (LEL&P) obtained a contract for some street lighting in March 1885 after a bitter fight in the City Council with Southwestern Brush. [5253]

New Orleans chartered the Edison Electric Illuminating Company on August 17, 1886, and Edison brought the incandescent bulb into New Orleans homes and businesses for the first time

[47] Louis Hennick and E Harper Charlton, *The Streetcars of New Orleans* (Gretna: Jackson Square Press 1969), 21.
[48]This is the basic system still in use today for subway and elevated trains where pedestrian contact with the third rail is unlikely.
[49] References so far do not indicate the source of power for this line.
[50] Report of City Council in *Daily Picayune*, October 1, 1884.
[51] *Daily Picayune*, October 11, 1883.
[52] *New Orleans Mascot*, March 14, 1885.
[53] *Daily Picayune*, November 11, December 5, 12, and 24, 1885.

utilizing equipment salvaged from its installation at the Cotton Expo.[54] Brush and LEL&P provided arc lights suitable only for street lights and fairly large open buildings such as theaters and factories.

Kendall mentions that the sixth and seventh districts received electric service in 1886 and the rest of the city electrified by 1887.[55] The City Council in that year voted to place the power lines underground in the commercial district.[56] In addition to expansions in commercial power, there were large in-house installations, notably at the Custom House which included 1,200 Edison lamps with two-boiler/generator sets.[57]

The original Union Street station of Southwestern Brush burned to the ground on July 17, 1888.[58] Southwestern Brush declared bankruptcy and the plant was purchased from the marshal's sale by Westinghouse and converted to their system, the first plant in the city to be converted to AC power. Southwestern Brush, the first company to provide commercial power to New Orleans and its original power plant disappeared within six years. Westinghouse also disappeared from the city and did not rebuild the Union Street Plant. This left only Edison and LEL&P as commercial power providers. LEL&P experienced some problems providing service to replace the areas previously served by Westinghouse.[59]

Electricity worked its way into the social and cultural life of the city when the Edison Company devised a promotion that went to the heart of what New Orleanians held dearest. They sponsored the Krewe of the Knights of Electra to create the first electrically lighted Mardi Gras parade in 1889. The parade originally scheduled for the Thursday before Mardi Gras (February

[54] "Entergy New Orleans-A Company History,2.
[55] Kendall. *History of New Orleans*, 530.
[56] City Council of New Orleans, Ordinance No. 13,838, adopted December 15, 1897.
[57] *Daily Picayune*, January 28, 29, 1887.
[58] Ibid, July 16, 1888.
[59] *Times-Picayune*, August 30, 1888; January 19, 1889.

28) was postponed to Saturday because of late delivery of the dynamo. It rained out on that date, and it failed to roll on the following Monday due to a lack of mules to pull the floats and heavy generating equipment.[60] There is no record that the Krewe ever paraded and no information on what happened to the floats and equipment.

As street lighting expanded, so did complaints about outages.[61] The mayor complained that the council created a monopoly for the street arc lighting (Maurice Hart and LEL&P).[62]

Street lighting played into the trials in the infamous Hennessy case where witnesses testified the light (from street lights in the area) was so good they clearly saw the assassin. [63] The police record (the beat cops noted the condition of lights as they patrolled) indicated that the lighting in the area was out but the notations for the lights were smudged, looking as they may have been changed from good to bad prompting conspiracy theories.[64]

Problems continued for LEL&P, and the city complained of a months' long (May to August) outage of street lights in Algiers.[65] In 1891, a strike by workers turned off most of the city lights.[66] A more significant long term problem surfaced when the Edison Co. sued LEL&P for patent infringement of their light bulb patents and said that they manufactured and installed bulbs without a license from Edison.[67] Despite these problems, LEL&P managed to stay in business until 1898 when Edison bought it out from a bankruptcy proceeding,

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[60] Joy Jackson. *New Orleans in the Guilded Age*: *Politics and Urban Progress 1880-1896* (Baton Rouge: LSU Press, 1969), 196, 237; *Times Picayune*, February 27, 1889, *Ibid*, March 4, 1889.
[61] *Ibid*, November 21, 1889; Jan 11, 1891.
[62] *Ibid*, March 24, 1891.
[63].*ibid*, March 26, 1891.
[64] Richard Gambino, *Vendetta: The True Story of the Largest Lynching in U.S. History* (Toronto: Guernica 2000), Discusses this case and the subsequent lynching of eleven Italian men accused of the murder of Chief Hennessey.
[65] *Times-Picayune*, August 6, 1891.
[66] *Ibid*, September 17, 1891.
[67] *Ibid*, February 11, 1892.

The spread of electric service to the housing market appeared in an ad for a new house on Dryades near Jackson that boasted electric and gas lights as well as an indoor bathroom.[68]

The electrification of the system of mule drawn streetcars in the city was the next significant development.

The Streetcar Boom, Bust, and Rationalization 1893-1910

Although a full scale electrified streetcar served the grounds of the Cotton Expo, electrification of the street railways in New Orleans did not begin until February2,1893, when the St. Charles Line rolled its first electric cars[69]

The electrification of the streetcars unleashed a tremendous growth spurt of electrification in the city. The rapidly electrifying streetcar lines needed large amounts of power and the car companies rushed to build generating plants. At least fourteen power plants were built within the city before 1910 (see appendix). Because streetcars mostly operated in the daytime and domestic and street lighting was necessary mainly in the evening hours, the car/electric companies began to supply power to the community. This relationship of streetcars and general electrification was very much in accord with what was common all across the United States.[70] The streetcar system was completely electrified by 1900 and street lighting made available throughout the entire city.

Significant residential electrification required several more years to accomplish. The rapid expansion was not without its share of problems. Complaints about outages of streetlights and of

[68] Ibid, February 26, 1893.
[69] *Times- Picayune*, February 3, 1893.
[70] David Nye, *Electrifying America*,96.

"brown outs" were common even as neighborhoods petitioned for additional service.[71] The problems of LEL&P continued with many complaints regarding service and finally led to a bankruptcy trial and allegations of corruption. [72][73][74][75]The Edison Co. bought LEL&P out of bankruptcy (including the Market St. Station) and built its own new plant on Barrone and Dryades in 1898 replacing its earlier 1886 plant located at that site.[76] The new station was still DC based and aimed at lighting and streetcar markets. Electric streetcars operated (and still operate) on DC power.

The overall situation with regard to transit and power generation became rather chaotic to say the least. The advent of alternating current technology and the economies of scale that if offered along with the financial strength of the trusts led by General Electric brought order and monopoly in relatively short order to New Orleans (and to most of the US as well).

Combining the Edison Company assets with several of the streetcar companies fallen into bankruptcy from overly ambitious expansions created a new entity, New Orleans Railway and Light Company (NOR&L). NOR&L chose the Market Street Station as their main power station and rebuilt it in 1906 utilizing the new AC technology. The AC power was easily converted to DC for streetcars and NOR&L was able to leverage its considerable cost advantages to rapidly consolidate both power generation and streetcars lines. NOP&L controlled essentially all power generation and streetcar service in New Orleans by 1910. NOR&L continued expansion of Market St. Station to become the sole generating station in New Orleans by 1922, a situation that continued until 1947. The company continued consolidation of both streetcar and electric

[71] *Daily Picayune*. August 25, 1894 (specifically linked streetlight outage to electric car service in the area),. September 25, 1894, September 35, 1895, November 19, 1895, March 20, 1896, June 16, 1896 (lights went out during council committee meeting to discuss the situation).
[72] *Ibid,* September 20.1895; November 19, 1895; January 30, 1896.
[73] *Ibid,* January 11, 1896.
[74] *Ibid,* January 11, 1896.
[75] *Ibid,* March 20, 1896.
[76] *Ibid,* September 1, 1898.

services until 1919 when it went into receivership. American Cities Company, the trust that controlled NOR&L, itself gone by 1922, was reorganized and brought out of receivership by a new city financed company, New Orleans Public Service (NOPSI). NOPSI in turn came under a GE owned trust, EBASCO, which around 1926 gobbled up the companies that along with NOPSI eventually became Middle South and then Entergy.[77]

These financial manipulations are fascinating in their complexity and in the greed and rapaciousness of American capitalism but beyond the scope of this investigation.

The Great Infrastructure Projects

Over 2000 years ago, the city of Rome had an efficient sewerage and drainage system as well as plentiful potable water, all powered by gravity. New Orleans was most unfortunate in its location because gravity mostly worked against it and the abundant water in the river was undrinkable. [78] The spring floods required levees along the river bank, and the numerous hurricanes confined the city to a narrow strip of land along the river. The high water table along with the swamps and marshes that surrounded the city made drainage and sewerage removal all but impossible.

The confluence of political will and technology in the 1890's allowed the city to overcome its problems with drainage, sewerage, and water supply. The political processes that led to support for cutting edge engineering designs and secured the necessary funding for these projects are discussed at length in previous publications.[79] Although electrical power is mentioned as the

[77] Louis Hennick, *Streetcars of New Orleans*, 28-38.
[78] Joan Garvey and Mary Lou Widmer, *Beautiful Crescent* (Tallahassee: Rose Printing Co., 1982), 22. LaTour, the Royal Engineer assigned to the Louisiana project argued against the site.
[79] See the dissertations by Robert L. Dupont and Carolyn Kolb in the bibliography

power source, previous works do not note that the projects required the AC systems that came available just as New Orleans began implementation of its infrastructure plans.

The Westinghouse/Tesla inventions of AC generators and motors had their first large scale demonstrations at the Chicago Columbian Exhibition and the gigantic power generation complex at Niagara Falls, both in 1893. This was the same year that the City of New Orleans directed the Drainage Board to develop a master plan for the cities drainage. The Drainage Board plan published two years later was comprehensive in the layout of drainage canals, pumping stations, and grids for sewerage collection and disposal. However, no discussion of how to power the system was included except to note that there were several recent developments in electrical technologies.

Despite the lack of discussion in the 1895 report, there is little doubt that the City Engineers charged with the implementation of the infrastructure plan knew of the recent availability of AC systems and multiphase motors. Most importantly, they understood the significance of these systems to the success of the drainage project and also to the sewerage system and to the potable water plant. This understanding of AC technology is borne out by the speed at which they incorporated AC electrical systems into the project plans going forward. It testifies to the very high level of expertise of the Drainage Board engineering team.

Drainage

The Mississippi River is higher than most of the land in the area and all drainage flows away from the river and north toward Lake Pontchartrain. Although the land right along the river is upwards of twelve-feet above sea level, the slope drops quickly to near sea level. Large areas of

swamp and marsh existed between Lake Pontchartrain and the city impeding drainage. Further drainage holdup occurred when runoff encountered old raised beds of former river distributaries.

Bienville's engineer La Tour recommended against the site even before the city was built because of the drainage problems the site presented.[80] Numerous efforts over the years sought to improve drainage. Several canals were dug toward the lake to facilitate drainage but the lack of land elevation slope made them ineffective.[81] In 1893, the City Council appointed an advisory committee to study the drainage problem and devise a plan for a system to correct it.[82] The results of the study, published in 1895, laid out a comprehensive plan for a drainage system including collection drains, major and satellite pumping stations, and improvements to the outfall canals to convey water to Lakes Borgne and Pontchartrain. [83] Discussion in the report expressed concerns regarding the potential for pollution from drainage into Lake Pontchartrain affecting the then operating lakefront resorts of West End, Spanish Fort, and Milneburg. [84] This concern for lake pollution led the engineers to develop a system able to pump low flow waters to Lake Borgne by way of Bayou Bienvenue. Then only heavy flows from large storms went into Lake Pontchartrain. This is a system known as "first flush" where the first runoff from a storm collects the most contamination and contaminants are greatly diluted when the rainfall gets heavy. The construction of a separate sewerage system significantly reduced the problems of drainage contamination. The report does not mention the types of pumps and their power source except to note that existing machines in place were antiquated and wholly inadequate for the new system, but many advances in technology could be evaluated for use. The proposed large and

[80] See note 77.
[81] See Kendall, 569 for discussion on the numerous efforts prior to the creation of the Drainage Board to solve the drainage problems.
[82] Ordinance No. 8327, adopted by New Orleans City Council, November 24, 1893.
[83] Drainage Advisory Board Report, *Report on the Drainage of the City of New Orleans*, 1895.
[84] *Ibid*,22-4.

complicated system included components spread over the whole expanse of the city. Pumping system requirements ranged from very large for the main drainage outfalls to very small for the sewerage lift stations.

Responsibility for implementation of the 1895 plan was vested in the Drainage Commission of New Orleans created by legislative act in 1896. [85] Work on the new drainage system began immediately. Chief Engineer Harrod presented to the Drainage Board the first two contracts for new canals in early 1897.[86]

Harrod presented a lengthy discussion of the motive power for the nine pumping stations at the same meeting where he advocated electrical power for the pumps. A new central AC power plant built by the Drainage Board was proposed to provide the required electrical power for multi-phase motor driven pumps. The size and complexity of the system made steam power wholly impracticable. Each of the nine stations required two boilers to insure reliability. A steam powered system added considerable capital requirements as well as large operating costs for manning and maintenance. Logistical requirements included the movement of large amounts of coal all over the city and problems with smoke and soot. The use of DC power was similarly impracticable as several power plants would be required to cover the extensive area.

Harrod also suggested the Board consider purchasing commercial power for the first two pumping stations to give some time for the development of the new multiphase power systems. The Drainage Board approved the use of electricity within the month and entertained a proposal by the Edison Co. to provide power.[87] However, Edison had very little AC capacity and they did not build a large AC plant until they rebuilt the Market St. Station in 1907. The Edison proposal included building a power plant and offered little advantage in timing or cost. In the end the

[85] Act No. 114 of the Louisiana Legislature, July, 1896.
[86] *Times Picayune*, January 15, 1897, 3.
[87] *Ibid*, January 30, 1897.

Board decided to construct a city owned plant.[88] A few days later the Board advertised for bids for pumping stations and the power plant and a contract let in July.[8990] Within a year of the Drainage Board creation, designs were completed and contracts let for major portions of the system utilizing what was then cutting edge technology.[91] The City of New Orleans built a central AC based power plant ten years before the first commercial plant appeared in the city.

In 1899, the Drainage Commission hired a newly graduated Tulane mechanical engineer, A. Baldwin Wood, who continued with the successor S&WB until the 1950's. He designed "flapgates," a simple backflow preventer that kept lake water from backing up into the system. Wood also designed a series of very large screw pumps that when installed in the pumping stations greatly increased capacity. These pumps, based on the very ancient concept developed by Archimedes, moved greater amounts of debris-laden water than any before. Countries like Holland, consulted with Wood and his pumps are used worldwide. These pumps remain in constant use in New Orleans to the present time a period of over one-hundred-years.

The Sewerage and Water Board of New Orleans created in 1899 merged with the Drainage Commission in 1902, and the S&WB continued with the responsibility for drainage, sewerage, and water to the present time.

Sewerage

Historically, sewerage in New Orleans was collected in private privies and cesspools that required pumping out to tank wagons and transported to the river and dumped. The removal often did not occur and sewerage overflowed into the slow moving drainage ditches. Kendall and others include anecdotal tales about the lack of sewerage removal and the resultant foulness of

[88] *Ibid*, March 26,1897.
[89] *Ibid*, March 21,1897.
[90] Ibid, July 23,1897.
[91] Act No. 6 of La Leg extra session, 1899. Required constant amendment.

the streets and the backswamp areas.[92] In 1890, a private company franchised by the city began installation of a sewerage system, but the franchisee installed only a small amount of piping before giving up. [93] The final S&WB system incorporated some of the piping from the earlier attempt at a system.

Responsibility for implementation of the sewerage part of the 1895 Drainage Plan went to the S&WB. There was strong community support for funding this project led by women's groups. A meeting of women taxpayers called by Ms. Evelyn Ordway rallied support for the issuance of bonds to pay for the sewerage and water projects. [94] Women could not vote at the time but were significant property owners and this certainly meant political clout.

The new sewerage system was entirely separate from the drainage system, an innovation for the time. The same elevation problems that faced the drainage system were worse for sewerage as sewerage required pumping over the levies into the river to avoid polluting the lake. Gravity fed sewerage from their sources in homes and businesses to eighty small unmanned lift stations. The small stations pumped the collected sewerage to two larger stations on the East Bank and one on the West Bank. The large stations then pumped the sewerage into the river at the Orleans/St Bernard Parish line. Electricity powered all of the pumps for the small lift stations as well as the main outfall ones. The new city-owned AC generating station provided power for this large and widely dispersed system. The same plant serviced the new drainage system and the water plant.

The S&WB felt that dilution afforded by the river, even at low flow, would bring down any pollution below detectable levels. This was true as long as there was a reasonable distance for the

[92] Kendall, *New Orleans,* 575
[93] *Ibid*,576
[94] *Times-Picayune*, February 19, 1899.

mixing to occur. At the time, St. Bernard Parish, located downriver from New Orleans, did not source water from the river so risk was minimal.

. The water intake for the city was located safely several miles upstream in conformance with best Roman Legion practice.

In 1981 after many years of litigation with the federal EPA, treatment facilities for the sewerage system were added.

Water

Water is an absolute necessity for life. The procurement of water for drinking and other essential uses concerned New Orleans from the city's founding. Although New Orleans is surrounded by water, no easy source of potable water exists. Mississippi River water has very high levels of suspended solids making it undrinkable. Rudimentary treatments available prior to 1900 were not effective. The lakes and bayous are brackish with salt contents too high to drink. The water table is very high and, while easily reached with shallow wells is incapable of any real flow and easily contaminated from the surface and subject to intrusion of salt water. Thus, the citizens of New Orleans collected rain water from roof drains into large wooden tanks called cisterns for almost two hundred years. Cisterns have serious drawbacks. The collection system is easily contaminated and the tanks themselves, if not properly secured, become breeding grounds for mosquitoes, the main vector for yellow fever. In times of drought when tank levels became low, the water was close to undrinkable. Reportedly, beer sales always spiked in times of drought.[95] There is no mention of where the brewers obtained their water.

The Mississippi River was always a source for water for purposes other than drinking and in May 1810, Louis Gleizes obtained a contract from the City Council to provide water to the city

[95] *New Orleans Mascot* (October 28, 1884). This was likely a kind of joke that this paper often indulged in.

for watering the streets for dust suppression and for fire protection.[96] A few years later, in 1819, the city contracted with Benjamin Latrobe to build a water works. It was completed by Latrobe's son in 1833. The company formed to operate the works continued until 1869 when the city took it over. That company returned to private hands in 1879 with an exclusive franchise, when the 7city was in dire financial straits.[97] The company never was able to develop any method for purifying the water and received numerous complaints of overcharges. The city brought suit, and after long and bitter litigation the Louisiana Supreme Court revoked the charter.[98]

The S&WB then took over the water works and developed a plan for the new system. To determine the optimum design for the new waterworks they built and operated a water purification pilot plant in the south-east corner of Audubon Park.[99] Electricity powered all of the components, including pumps for the intake, distribution, chemical addition, and the mixers. Construction of the pilot plant began in September 1900 and was completed in December of that year. It operated until August 1901. The plant produced up to ninety-three thousand-gallons of pure water per day (enough for one thousand people) and consisted of four different system components. These systems allowed the engineers to develop optimum settling times, filtration methods, and coagulation rates. The full scale waterworks, based on the design developed during the pilot work, was located at the Jefferson/Orleans Parish line and operational by 1907. It had a capacity for forty million gallons per day and the site was laid out for a fourfold future expansion. The new S&WB AC electric generator nearby provided power. The water and power plants are still operational and use the basic technology established one hundred years ago.

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[96] Record of the City Council, May 10, 1810 as quoted in Kendall, 590
[97] Kendall,113 and 527
[98] "The Waterworks Case Decided" (*Daily States*, May 22, 1889).
[99] Sewerage and Water Board of New Orleans, *Report on Water Purification Investigation and on Plans Proposed for Sewerage and Water Systems*, 1906.

Conclusion

The fortuitous availability of AC systems including large central power plants and multi-phase motors just as the city politics came together to support major infrastructure improvements made it possible for New Orleans to undertake one of the largest public works programs ever attempted. The city completed it reasonably on time and on budget utilizing new cutting edge technology. More importantly, it accomplished all its major objectives. Drainage vastly improved, and the improved drainage allowed the city to expand toward the lake, thus finally escaping the narrow boundaries along the river. The electric street car lines quickly expanded into the newly developed areas giving the city a semblance of the suburban growth that began several years before in much of the rest of the country. Sewerage was collected and disposed downriver below the city, and abundant potable water provided for the whole city. These infrastructure projects had a dramatic effect on public health as shown by mortality rates dropping from 27.2 per thousand to 19.8 per thousand by 1913 compared to a southern city average of 21.2 per thousand.[100] In the worst recorded year of yellow fever in 1853, the mortality rate reached 99.2 per thousand and 12,000 deaths were recorded.[101] The adoption of AC power by the city did much to reverse the negative trends operational in New Orleans after the Civil War.

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[100] Behrman, Martin. New Orleans: "A History of Three Great Public Utilities, Sewerage, Water and Drainage, and their influence upon the Health and Progress of a Big City." Paper Read by Hon. Martin Behrman of New Orleans, La. before Convention of League of American Municipalities, Milwaukee, Wis., September29, 1914.

[101] Joseph Jones, M.D. "Table C, Mortuary Statistics of New Orleans, Louisiana, United States of America, During a Period of 34 Years, 1844-1880, Consolidated From Original Reports and Records" Medical and Surgical Memoirs: Containing Investigations on the Geographical Distribution, Causes, Nature, Relations and Treatment of Various Diseases, 1855-1886. Vol. 3, (New Orleans: Joseph Jones, 1890).

Mayor Behrman summed up the effort best in a speech before a convention of the League of American Cities:

> These three great public utilities stand enduring monuments to the courage, determination and infinite resourcefulness of a people who cheerfully and with much self-denial made them possible of accomplishment, and no less are they tributes to the ability, zeal and splendid engineering skill of those who devised and brought them to a successful consummation, in spite of most disheartening conditions.[102]

There is a statue of Nikolai Tesla at Niagara Falls overlooking the great power generation facility that he fathered. It would be appropriate for New Orleans to erect a similar statue to Tesla to honor the man whose inventions saved the city.

[102] Behrman, Martin. "New Orleans": (note 79).

Afterward

The systems installed for water, drainage and sewerage in New Orleans are still in place and operational after a hundred years. The United States Army Corps of Engineers (COE) incorporated protection from hurricanes into the drainage system starting in the 1960's with perimeter levees around the area. The COE work included levees on the outfall canals from the original pumping stations to protect the reclaimed land in the Mid- City and Lakeview areas. These levees failed catastrophically in Hurricane Katrina flooding New Orleans back to its pre-1900 area. The drainage, sewerage, and water distribution systems all sustained major damage.

The COE recently completed a massive fifteen billion dollar project to build a huge wall around the New Orleans area to protect it from future floods. However, the old drainage system still stands at the heart of the city without much change and the damaged water and sewerage systems have not been adequately addressed. We will see how it all works out.

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Attachment

Notes on early

New Orleans Power Generation Facilities

Southwestern Brush Electric Company. charted June 11, 1881.Station located lake side of Dryades at Union (now a parking lot). Startup January 7, 1882. It powered forty-five arc lights (no locations given except for a drug store at Barrone and Canal).
Second Station located at Notre Dame and Front Street, operational April 1882. It powered one-hundred-four arc lights along river between Julia and Piety.
By January, 1883 they had twelve generators that powered four-hundred-eighty arc lights
In 1884/1885 they lost bids to LEL&P for street lights.
On July 16, 1888 the Union St. station burned down (it contained thirteen generators). The article said station was owned by Westinghouse who bought it in April, 1888 at a Marshall's sale. Southwestern Brush had gone bankrupt and assets sold. Picayune article did mention that the facility had been modified to generate A/C via the Westinghouse system. I found no references as to whether it was rebuilt.
Also no reference regarding the fate of Station Two at Notre Dame St.

Edison Electric Illuminating Company charted August 17, 1886. Station located on Barrone St. between Perdido and Poydras and later extended through to Penn St. It included a one-thousand horsepower driver. Much of the equipment was salvaged from the Edison exhibit at the Cotton Exposition. Another reference is to Edison Plant on

Union between Baronne and Dryades with frontage on Barrone that operated until 1923 (3900kw). This second plant was commissioned in September 1898 and the original plant demolished. There was a three story office in front with a firewall separating the office from the power plant. The plant occupied the square of Baronne, Union, Gravier and Dryades. It fronted on Union, the footprint of the plant was one-hundred-feet by one-hundred-thirty-eight feet. Required one-thousand fifty-foot pilings

The new plant had a twelve-hundred horsepower steam driver (Williams triple expansion marine type) and two of six hundred horse power each (one of these was salvaged from old plant). These generators were DC only and the output could only service a two-mile radius. The plant investment was five-hundred thousand dollars. There was a small fourth unit of four-hundred horse power AC type output (twenty-three hundred-volts) providing power for outlying areas using arc lights. This must have been one of the last DC only plants built in the US.

There was a description of a twenty -five-ton overhead crane that was electrically powered and a description of the basement which held electrical boiler feed pumps and a sump pump. There was no description of the motors as to whether they were AC or DC. The boiler plant fronted on Union St. Two cooling towers were located on the roof and served condense outlet steam to recover the water for boiler feed.

There were stables on Dryades St.

Westinghouse was supposed to have installed a plant in 1887 and did buy the Brush Union St. station in 1888(above). I have no information as to where the 1887 station was

and if the Brush plant was rebuilt after the fire there. It likely was not because of the new Edison plant (above).

Claiborne Steam-Electric Generating Plant- located on river front at Elysian Fields and North Peters operated 1896-1922 (about 3800kw) mainly for streetcars.
Builder was likely Canal &Claiborne Railway based on name and purpose. Building is still in existence and used as a switch station by Entergy.

Merchants Plant Genois and Julia (Xavier campus) Shutdown in 1903.

Orleans Railroad Company plant Lafitte and Prieur Shutdown in 1903.

St Charles Street Railroad Company -plants at Decauter and Marigny and the Napoleon Ave. Plant shutdown in 1908.

The Consumers Electric Power & Light Company. operated 1906-1915.
3500kw location not known. Company later bought power from Market St

Citizens Power & Light Company 1500kw into NOPSI in 1925. Built? It had diesel generators so pretty recent like after 1915. Location and details not known.

LEL&P (Maurice Hart) had contracts for Cotton Expo (1884) and city street lights (1885) and had plant employing Jenney technology. This was the original Market St

Station. Reference to it being absorbed by Edison in 1888 when Edison bought LEL&P out of bankruptcy.

Market Sreet was rebuilt several times and was ultimately the sole power source for New Orleans under NOPSI. Expansions and ownership changes included:

1885 To 1901? kw

1901-4 to 6000kw

1906-9 to 21,500kw This was the rebuild that resulted in the building still prominent on the river skyline upriver of the Convention Center. This was also the first commercial plant utilizing A/C systems on a large scale. This was ten years after the city built an A/C based plant.

1916- Additional 15,500kw.

1918 additional 11,500.

All units prior to 1918 replaced and expanded over years until 1952 and operated to 1973. It was the only commercial power station in NO from 1925-1947.

New Orleans Traction Company (charted 11/24/92) bought up some street railways to electrify buying power from LEL&P 1894-6 and buying the Market St station in 1897 (from Edison) The co reorganized in 1899 as

New Orleans City Railway Company. Started rebuilding and expanding Market St. 1901-4. The company was reorganized again in 1905 as

New Orleans Railway and Light Company which continued expansion of Market St. and consolidation of both streetcar and electric co until 1919 when it went into the receivership that led to NOPSI formation.

Vita

The author was born in New Orleans, Louisiana. He obtained his Bachelor Degree in Chemistry from the University of New Orleans as a member of that university's first graduating class in 1962. He then obtained his Doctor of Philosophy degree in Physical Organic Chemistry from Louisiana State University in 1965. After graduation he was employed by the American Cyanamid Company at its Fortier Plant near New Orleans. He served at that site in a series of increasingly responsible managerial positions until retirement in 2005. His main areas of expertise were in process technology and environmental engineering. Since retirement he has consulted in his areas of expertise on a part time basis and has since 2008 been enrolled in the Graduate School at the University of New Orleans studying history.

He is married to the former Sylvia Johns for 52 years, and they have been blessed with three children and seven grandchildren.