Municipalization vs. Private Entrepreneurship: Deutsche Continental-Gas-Gesellschaft Gasworks in Warsaw, Kraków, and Lviv and their Role in the Modernization of Emerging Cities in the Second Half of the Nineteenth Century

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ABSTRACT

The article discusses the mid-nineteenth-century introduction of gas production technology by the Deutsche Continental-Gas-Gesellschaft to the emerging cities in the area of the former Polish-Lithuanian Commonwealth, namely Warsaw, Lviv, and Kraków. During the 1870s and 1880s, the local governments of Kraków and Lviv, dominated by Polish influences, sought to portray themselves as agents of modernization. Consequently, the arrival of a German investor implementing unfamiliar gas production technology was unwelcome. This resulted in the takeover (in Lviv) or buyout (in Kraków) of the gasworks in operation. In contrast, Warsaw, under the administration of Russia, reached an agreement with the concessionaire. Modernization of the gas industry in these cities commenced in the late nineteenth century, with management falling under both municipal (Kraków and Lviv) and private (Warsaw) entities. This allowed for the expansion of the gasworks and a subsequent increase in gas consumption, as facilitated by the reduction in the product's price. However, Kraków and Lviv managed to present themselves as the architects of this favorable situation. Meanwhile, the authorities in Warsaw permitted the Dessau company to operate within the city, which engendered discontent among the Polish intelligentsia in the early twentieth century. In Germany and the Habsburg monarchy, it was customary for cities to municipalize their gasworks, with the profits channeled back into city budgets. This aspect of urban modernity, as it was perceived at the time, was absent in Warsaw.

KEYWORDS: Warsaw, Lviv, Kraków, Deutsche Continental-Gas-Gesellschaft, urban modernization, gasworks, municipalization, municipal companies

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The author has declared that no conflicts of interest exist.

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Introduction

The widespread adoption of gas for lighting represented the culmination of a lengthy and progressive technological development, commencing with the seventeenth-century practice of degassing wood or coal to obtain tar, yielding a by-product of flammable gas emissions. By the late eighteenth century, innovators with a keen interest in adapting diverse technologies for public use began to explore the potential of this flammable gas. The conditions for the successful popularization of this novel industry were particularly favorable in Great Britain, where a convergence of technical expertise, experience, and capital from associated investors fostered the establishment of joint-stock companies. These companies approached municipal governments with offers to commercialize gasworks, employing an underground pipeline system for the distribution of light gas.[1] Among these companies was the Imperial Continental Gas Association (ICGA), founded in London in 1824, which rapidly expanded its investments to include German cities. In exchange for granting the ICGA a long-term monopoly on gas production and supply, the company installed advanced technical equipment and recruited skilled professionals to oversee its operations. This collaborative model proved advantageous during the second quarter of the nineteenth century for cities mandated by higher authorities to ensure public safety by illuminating public spaces after dark. The gas burners emitted a brilliant white light, considered a more dignified means of illumination, particularly suited for capital cities and monarchical residences.[2] Consequently, city authorities, then preoccupied with settling debts from the Napoleonic wars, found that the gas lighting system provided a noticeably improved street lighting effect compared to the previously used oil lamps, all without requiring the substantial commitment of their own resources.[3]

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1 From the extensive body of literature, the issue of the emergence of the gas industry is comprehensively covered by: MALCOLM E. FALKUS: The Early Development of the British Gas Industry, in: The Economic History Review 35 (1982), 2, pp. 217–234; LESLIE TOMORY: Progressive Enlightenment: The Origins of the Gaslight Industry 1780–1820, Cambridge, MA 2012.

2 HANS-DIETER BRUNCKHORST: Kommunalisierung im 19. Jahrhundert: Dargestellt am Beispiel der Gaswirtschaft in Deutschland, München 1978, pp. 57–59; YVONNE BATHOW: Die Berufsgruppe der "Gas- und Wasserfachmänner": Ihre Bedeutung für die kommunalen Investitionen in der zweiten Hälfte des 19. Jahrhunderts, in: KARL HEINRICH KAUFHOLD (ed.): Investitionen der Städte im 19. und 20. Jahrhundert, Köln 1997, pp. 123–147, here pp. 123–124.

3 JOHANNES KÖRTING: Geschichte der deutschen Gasindustrie mit Vorgeschichte und bestimmenden Einflüssen des Auslandes, Essen 1963, pp. 104–109; WOLFGANG KRABBE: Kommunalpolitik und Industrialisierung: Die Entfaltung der städtischen Leistungsverwaltung im 19. und frühen 20. Jahrhundert: Fallstudien zu Dortmund und Münster, Stuttgart 1985, pp. 41–42; HORST MATZERATH: "Kommunale Leistungsverwaltung": Zu Bedeutung und politischer Funktion des Begriffs in 19. und 20. Jahrhundert, in: HANS HEINRICH BLOTEVOGEL (ed.): Kommunale Leistungsverwaltung und Stadtentwicklung vom Vormärz bis zur Weimarer Republik, Köln et al. 1990, pp. 3–24, here p. 7.

The introduction of gas lighting was initially perceived as a precarious undertaking until the 1870s. Due to the associated risks, German cities permitted private investors, such as the ICGA, initially, and later German entrepreneurs who had acquired expertise in the industry, to establish gasworks. These private investors were granted concessions with specific contractual stipulations to mitigate the risk of bankruptcy. These provisions included exclusive rights to gas production, control over gas prices, and assured waste disposal by the city. At that time, only a few municipalities chose to operate gas plants independently. As the concession period progressed and the number of gas consumers grew, concerns arose regarding the quality and high cost of gas. During the 1870s and 1880s, local authorities and residents began to raise their expectations. In the German *Journal für Gasbeleuchtung und verwandte Beleuchtungsarten* (Journal for Gas Lighting and Related Types of Lighting), it was remarked that "gas is no longer a luxury good but a necessity of life,"[4] reflecting the increasing demand for greater gas availability, affordability, and improved lighting quality. In response to these expectations, gas companies demonstrated a willingness to renegotiate the terms of existing contracts, provided they were granted extended monopolistic privileges. If not, they adhered to the rigid conditions outlined in contracts negotiated decades earlier, often leading to strained relationships with the municipalities. Conversely, the cities lacked experience in managing industrial enterprises, leading to concerns that their involvement might result in losses for the gas plants. Consequently, most cities chose to extend the concessions, ensuring continued operation by private entities.[5]

Historians examining the economic and municipal political dynamics of German cities in the "long nineteenth century" have observed a notable shift in the approach of urban decision-makers. This transition is characterized by a departure from the principles of liberalism, often referred to as "Manchesterism", towards what is termed "municipal socialism" in historical sources. The concept of municipal socialism pertains to a concerted effort to ensure public access to essential goods and services, such as waste disposal, transportation, water supply, food, gas, and electricity. This was achieved through municipal enterprises that prioritized social objectives over profit maximization, distinguishing them from private enterprises.[6] During the mid-nineteenth century,

4 Gemeindegasanstalten oder Privatbetrieb?, in: Journal für Gasbeleuchtung und verwandte Beleuchtungsarten 12 (1869), 7, pp. 336–345, here p. 344.

5 Ibid., p. 338; BRUNCKHORST, pp. 91–95, 162–180; BATHOW, pp. 133–136.

6 KRABBE, Kommunalpolitik und Industrialisierung, pp. 43–49; WOLFGANG KRABBE: Städtische Wirtschaftsbetriebe im Zeichen des "Munizipalsozialismus": Die Anfänge der Gas- und Elektrizitätswerke im 19. und frühen 20. Jahrhundert, in: BLOTEVOGEL, pp. 117–135, here pp. 121–123; HORST A. WESSEL: Die Versorgung von Kommunen mit Wasser, Gas und elektrischer Energie von etwa 1850 bis 1914, in: JOSEF WYSOCKI (ed.): Kommunalisierung im Spannungsfeld von Regulierung und Deregulierung im 19. und 20. Jahrhundert, Berlin 1995, pp. 49–90, here pp. 65–76; PETER WILDING: Technik und Urbanität: Der Ausbau der technischen Infrastruktur als Leitmotiv städtischer Mo-

urban decision-makers recognized sanitation as a municipal responsibility. Consequently, expanding cities sought to address issues of water quality and waste disposal through infrastructural systems, such as water supply and sewerage, accessible to all residents. These systems were designed to mitigate the adverse effects of industrialization and urbanization. Notably, Lorenz Jellinghaus proposes that the construction of these central systems by urban elites demonstrated the superiority of liberal forces over an aristocratic and conservatively oriented state civil service.[7] As the 1880s approached, the scope of municipal responsibilities continued to expand. With increasing urbanization, many cities expressed the desire to take charge of public lighting independently, viewing private monopolies controlled by contracts as less desirable. Instead, there was a growing sentiment that the revenue generated by the expanding gasworks should benefit the cities themselves, allowing them to pursue social policies rather than enriching capitalists.[8]

The primary objective of this study is to examine the implementation of gas technology in three Eastern European metropolises, namely Warsaw, Lviv, and Kraków, by the Deutsche Continental-Gas-Gesellschaft (DCGG). The study aims to investigate whether and to what extent the German model of gas implementation in urban centers was replicated in these cities. Furthermore, the study seeks to analyze how local decision-makers in these cities overcame their initial reluctance to engage in industrial investments, thus deviating from the prevailing liberal paradigm that discouraged municipal administrations from assuming such risks. This shift, in turn, acted as a catalyst for modernization, which was best implemented by municipal governments. In this context, modernization entailed rapid socio-economic changes (including urbanization and industrialization) and a confluence of interdependent factors in response to these changes. Key among these factors were the growth of urban populations and the resulting social problems, the transfer of knowledge about technical innovations from centers to peripheries as well as between peripheries, the expansion and enhancement of municipal administrations' competencies, and the pursuit of improving quality of life through the development of what Jürgen Reulecke terms "urban technology."[9] The question of municipalization should

dernisierung in Wien und Graz um 1900, in: HEIDEMARIE UHL (ed.): Kultur—Urbanität—Moderne: Differenzierungen der Moderne in Zentraleuropa um 1900, Wien 1999, pp. 243–286, here pp. 247–249.

7 LORENZ JELLINGHAUS: Zwischen Daseinsvorsorge und Infrastruktur: Zum Funktionswandel von Verwaltungswissenschaften und Verwaltungsrecht in der zweiten Hälfte des 19. Jahrhunderts, Frankfurt am Main 2006, pp. 88–89.

8 Ibid., pp. 214–218.

9 JÜRGEN REULECKE: Geschichte der Urbanisierung in Deutschland, Frankfurt am Main 1985, pp. 56–62. The role of nineteenth-century cities in the dissemination of knowledge and the practical application of innovation is analyzed by: HEIDI HEIN-KIRCHER: The City and the Knowledge in East Central Europe: Plea for a Stronger Tie-Up in Research, in: Journal of Urban History 43 (2017), 4, pp. 625–638, here pp. 628–632; ESZTER GANTNER, HEIDI HEIN-KIRCHER, OLIVER HOCHADEL: Searching for Best Practices in In-

also be considered in terms of whether it was related to the program of "strengthening Polishness" of the multi-ethnic Lviv, as analyzed by Heidi Hein-Kircher in her study of the municipal policy of the local government.[10] Additionally, the article investigates the role of the Russian local and supreme administration in managing Warsaw, which had lost its self-government. This aspect is examined through the insights provided by Malte Rolf's research on the city's relations with the Polish elite.[11]

The development of the gas industry and its role in the modernization of emerging Eastern European cities in the second half of the nineteenth century are examined using a variety of primary sources.[12] These sources include administrative reports generated by the DCGG company management. Additionally, documents and publications issued by the municipal authorities of Lviv and Kraków are analyzed alongside contemporary socio-economic literature. This literature encompasses diverse expert opinions on urban, economic, and technical matters published in the press as well as professional journals and standalone studies. Such sources are particularly valuable for the case of Warsaw, given the destruction of the municipal archives during the Warsaw Uprising.

Deutsche Continental-Gas-Gesellschaft's Investments in Warsaw, Kraków, and Lviv

The activities of the English company ICGA in the production and distribution of light gas in German cities were imitated by the banker Louis Neulandt. He proposed the establishment of a gas company with German capital to compete with the English counterpart. To realize this idea, Neulandt collaborated with Hans Victor von Unruh (1806–1886), an expert in the gas industry who had received his education at the Bauakademie in Berlin. Working together with German gas pioneer Rudolf Sigismund Blochmann (1784–1871), they successfully organized the construction of a gasworks in Magdeburg between 1851 and 1853. Neulandt and von Unruh also attempted to establish a gas company in Prussia. However, they faced challenges obtaining government concessions,

terurban Networks, in: ESZTER GANTNER, HEIDI HEIN-KIRCHER et al. (eds.): Interurban Knowledge Exchange in Southern and Eastern Europe, 1870–1950, New York et al. 2020, pp. 1–22.

10 HEIDI HEIN-KIRCHER: Lembergs "polnischen Charakter" sichern: Kommunalpolitik in einer multiethnischen Stadt der Habsburgermonarchie zwischen 1861/62 und 1914, Stuttgart 2020.

11 MALTE ROLF: Imperiale Herrschaft im Weichselland: Das Königreich Polen im Russischen Imperium (1864–1915), Berlin et al. 2015, pp. 183–279.

12 The current state of research and research postulates on urban modernization in East Central Europe are discussed by: ESZTER GANTNER, HEIDI HEIN-KIRCHER, OLIVER HOCHADEL: Backward and Peripheral? Emerging Cities in Eastern Europe, in: Zeitschrift für Ostmitteleuropa-Forschung 67 (2018), 4, pp. 475–484.

primarily due to von Unruh's association with liberal political ideologies and his participation in the 1848 revolution. As a result, August von Heydt (1801–1877), the Prussian Minister for Trade, Industry, and Public Works, opposed his appointment to influential positions.[13] To overcome these obstacles, Neulandt acquired a concession from Leopold IV Frederick, Duke of Anhalt-Dessau, and founded the DCGG on 12 March 1855 with its headquarters in Dessau.[14]

During the first shareholders' meeting on 7 May 1855, 400,000 thalers were raised through share subscriptions as startup capital. In the following two years, an additional 2 million thalers were raised this way, which were intended to be invested in constructing gasworks. The company aimed to establish these gasworks in towns with an expected gas demand of no less than 5 million cubic feet per year (approximately 142,000 cubic meters). The construction costs of the gas plants were limited to 40,000–50,000 thalers. The company's management, comprising a board of three directors (Neulandt, von Unruh, and from November 1856, the former mayor of Mülheim/Ruhr, Wilhelm Oechelhäuser), decided to negotiate concession agreements with cities where the projected gas demand would provide an opportunity for capital recovery.[15] Consequently, agreements were made with several Prussian cities, including Luckenwalde, Frankfurt (Oder), and Potsdam. The expansion of investments also extended to relatively less populous towns such as Dessau and Erfurt, along with cities in the Ruhr district, such as Mülheim/Ruhr, Hagen, Gladbach, and Rheydt. In the latter case, additional gas supply contracts were secured due to the presence of growing industrial facilities.[16] Following the expansion of ICGA's investments, the Dessau gas company shifted its focus to more substantial cities in the former Polish-Lithuanian Commonwealth, which served as administrative centers for the provinces of the Russian and Habsburg empires. The capital city of Warsaw (over 160,000 inhabitants) and Lviv (over 70,000 inhabitants) were viewed as promising markets for gas sales. Additionally, Kraków, connected by rail with Prussia and Austria and boasting a population of around 50,000, was anticipated to emerge as a significant trading center within the northern territory of the Habsburg monarchy.[17]

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13 KÖRTING, p. 118.

14 WILHELM VON OECHELHÄUSER: Die fünfzigjährige Entwicklung der Deutschen Continental-Gas-Gesellschaft 1855–1905, in: WILHELM VON OECHELHÄUSER: Aus deutscher Technik und Kultur, 2nd ed., München et al. 1921, pp. 155–170, here pp. 155–156; GERT VON KLASS: Deutsche Continental Gas Gesellschaft 1855–1955, Düsseldorf 1955, pp. 12–13; KÖRTING, p. 119; BATHOW, p. 139.

15 KLASS, p. 14; KÖRTING, p. 119.

16 Managerial Report for the Year 1855, in: Landesarchiv Sachsen-Anhalt (LASA), Deutsche Continental-Gas-Gesellschaft (DCGG), sign. 1: Geschäftsberichte des Direktoriums (1855–1865), fol. 1–3.

17 Ibid., fol. 3–4.

Regarding Lviv and Kraków, the DCGG faced competition from the Austrian Gas Lighting Association (Österreichische Gasbeleuchtungs-AG), which was established around the same time and was based in Vienna. This Austrian company was in the process of constructing gas plants, including one in the capital of the monarchy, competing with the already existing gas plants established by the ICGA. Furthermore, the Austrian Gas Lighting Association was also setting up gas plants in Bratislava (Preßburg) and Timișoara (Temeswar) and subsequently expanded its investments to target the largest cities within the monarchy.[18] In 1856, the management of both the DCGG and the Austrian Gas Lighting Association decided to enter into an agreement. As part of this agreement, the DCGG purchased a one-third share of its Austrian competitor, and the market was divided so that the DCGG could establish gasworks in Galicia, while the Austrian company could do so in the remaining areas of the monarchy. In return for this arrangement, the DCGG granted its Austrian partner a one-third share in its Galician gas plants.[19]

In the case of the capital of the Kingdom of Poland, which had been established following the Congress of Vienna, the Dessau company was overtaken by Georg Moritz Blochmann (1820–1894), the son of Rudolf Sigismund Blochmann. In 1853, Georg Moritz managed to persuade the Warsaw magistrate and the supervising Administrative Council of the Kingdom of Poland to accept his proposal for the construction of a gasworks.[20] He had gained experience from cooperating with his father, who founded the first city-owned gasworks in the German states in Dresden and had successfully established gasworks in smaller towns in Saxony.[21] However, Georg Moritz Blochmann faced challenges in Warsaw. Due to the fear of investing in Russia that emerged among capital holders after the outbreak of the Crimean War, he encountered difficulties in raising funds for the gas plant in Warsaw. As a result, he approached the DCGG with a proposal for a partnership, but his position was not strong. The attorneys of the DCGG managed to renegotiate the terms of the concession, and the contract with Blochmann was eventually declared invalid by the Administrative Council.[22]

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18 FRANZ BÖSSNER: Private Gasanstalten, in: PAUL KORTZ (ed.): Wien am Anfang des XX. Jahrhunderts: Ein Führer in technischer und künstlerischer Richtung. Vol. 1: Charakteristik und Entwicklung der Stadt. Ingenieurbauten, Wien 1905, pp. 249–250.

19 Managerial Report for the Year 1856, in: LASA, DCGG, sign. 1, fol. 6–7.

20 ADAM SZCZYPIORSKI: Warszawa, jej gospodarka i ludność w latach 1832–1862 [Warsaw, Its Economy and Population in the Years 1832–1862], Warszawa 1966, p. 112; MARIAN GAJEWSKI: Urządzenia komunalne Warszawy: Zarys historyczny [Municipal Facilities of Warsaw: A Historical Outline], Warszawa 1979, p. 129.

21 The significance of Rudolf Sigismund Blochmann's work for the development of the German gas industry is addressed by: KÖRTING, pp. 111–112; BATHOW, p. 134.

22 Managerial Report for the Year 1855 (as in footnote 16), fol. 4; Zbiór przepisów administracyjnych Królestwa Polskiego: Wydział Spraw Wewnętrznych [Collection of Administrative Regulations of the Kingdom of Poland: Internal Affairs Department], part

It is noteworthy that during the fourth and fifth decades of the nineteenth century, the residents of the cities under consideration had the opportunity to witness the effects of gas illumination. In 1830, Carl Mohr, a professor at the Technical Institute in Kraków, implemented gas lighting on Gołębia Street, installing several gas lamps.[23] Likewise, in Warsaw, the banker Adam Epstein (1800–1870) initiated the illumination of the Bank of Poland building using gas. To achieve this, the necessary gas-making equipment was imported from Paris. Subsequently, the Evans brothers' factory and the Government Machinery Factory started producing gas for their internal purposes. Notably, the gas produced at the latter was utilized to illuminate Castle Square and university buildings in 1844.[24] Although these experimental illuminations were reported in the daily press, they failed to generate enthusiasm among municipal decision-makers who remained skeptical about this relatively unfamiliar technology. The Warsaw authorities responded negatively to various offers to establish a gasworks in the city. Conversely, the Senate of the Free City of Kraków expressed interest in gas lighting in 1844, and three years later, the city authorities, nominated by the Galician Gubernium after Kraków's incorporation into the Kingdom of Galicia and Lodomeria in 1846, considered the matter. As was observed in British and German cities, the key factor in their deliberations was cost calculation, which revealed that gas lighting expenses could be up to 40 percent higher compared to the use of oil lamps for street lighting.[25]

During the mid-nineteenth century, German entrepreneurs and technicians achieved a significant breakthrough in the advancement of the gas industry, offering appealing deployment opportunities to smaller and medium-sized cities. This development was not confined to Germany alone; the cities within the Habsburg monarchy also experienced the benefits of this industrial boom. The magistrates of Warsaw, Kraków, and Lviv, along with their supervising authorities, were particularly enticed by the alluring tariffs presented in 1856. In the case of Warsaw, the renegotiated contract terms were compared with those offered in Paris. The gas committee, established at the initiative of the Governor of the Kingdom of Poland, found the proposed fee of 18.50 rubles (equivalent to 20 thalers) for the annual heating of a single street lamp remarkably attrac-

5, vol. 2: Zarząd gospodarczy miasta Warszawy [Economic Board of the City of Warsaw], Warszawa 1868, p. 623.

23 GRZEGORZ MLECZKO: 150 lat Gazowni Krakowskiej [150 Years of the Kraków Gasworks], Kraków 2006, p. 13; ALEKSANDER ŁUPIENKO: W stronę systemu: Infrastruktura techniczna dziewiętnastowiecznego miasta na przykładzie Galicji [Towards the System: Technical Infrastructure of the Nineteenth-Century City on the Example of Galicia], Łódź 2021, p. 146.

24 SZCZYPIORSKI, p. 112; ŁUPIENKO, p. 141.

25 SZCZYPIORSKI, p. 111; GAJEWSKI, p. 128. In British and German cities, it was generally assumed that, at similar costs, gas lighting should be more intensive than oil lighting, cf.: BRUNCKHORST, p. 117; TOMORY, p. 122.

tive, as it was 4 rubles lower than the corresponding fee in the French capital.[26] An in-depth analysis of the terms and conditions of the concluded contracts reveals that the DCGG employed stringent provisions modeled on the English system of concession contracts. Each individual contract differed in the duration of the granted monopoly to the company and in the tariffs, which were adjusted based on the population potential of the respective cities. During that period, the population potential of these cities was the primary determinant influencing the anticipated profits for the company.[27]

As in Frankfurt (Oder) and Potsdam, the concession in the smaller city of Dessau, due to its designation as the company's headquarters, was exceptionally set for 25 years. At the end of this period, the gas plant could be repurchased from the investor, opening up the possibility of introducing free competition or extending the concession for another 15 years. Consequently, cities had the opportunity, after a 40-year monopoly, to assume ownership of the gas plant. On the other hand, contracts in the less populous towns of the Ruhr area and Luckenwalde were concluded for a longer period of 30 years. Following this duration, the gasworks could be acquired or taken over after an additional 20 years of concession.[28] The provision allowing the city to assume control of the gasworks, an option not utilized in the ICGA contracts, held particular appeal for municipal decision-makers who were concerned about long-term reliance on a private operator. This provision served as a means of safeguarding against potential permanent dependence on private entities.[29]

The agreements established precise guidelines for the areas within the public space that the developer was responsible for illuminating. Furthermore, they specified that the construction of the gas plant and gas mains would be supervised by municipal officials. A mechanism for extending the gas network was also introduced, which depended on having a sufficient number of burners (five or six) in 100-foot (approximately 30-meter) stretches of street. The contracts also regulated the gas demand and brightness of the burners used in streetlights. It was agreed that each burner consuming 5 cubic feet (approximately 0.14 cubic meters) of gas per hour should emit light with an intensity equal to 12 can-

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26 Zbiór przepisów administracyjnych Królestwa Polskiego, p. 627; ADOLF SULIGOWSKI: Pisma [Writings]. Vol. 2: Kwestie miejskie [Urban Issues], Warszawa 1916, pp. 279–280.

27 The information given below is taken from the content of the concession agreements that were signed with Warsaw 1856-04-19, with Krakow 1856-04-16 and with Lviv 1856-02-12. For Warsaw see: Zbiór przepisów administracyjnych Królestwa Polskiego, pp. 635–665; for Kraków see: Sprawozdanie komisji rady miejskiej w sprawie gazowej [Report of the City Council on the Gas Issue], Kraków 1871, pp. 15–25; and for Lviv see: Sprawozdanie komisji rady miejskiej w sprawie gazowej [Report of the City Council on the Gas Issue], Lwów 1877, pp. 1–15, here as an Alegat 1.

28 Cf.: NICOLAS HEINRICH SCHILLING: Statistische Mittheilungen über die Gas-Anstalten Deutschlands, der Schweiz und einige Gas-Anstalten anderer Länder, München 1862, pp. 28, 41, 47, 54, 72, 83; WESSEL, p. 71.

29 Die Entwicklung der Deutschen Continental-Gas-Gesellschaft zu Dessau in den ersten 25 Jahren ihres Bestehens 1855–1880, Dessau 1881, p. 10.

dles in Kraków and Lviv but only 7 candles in Warsaw. Additionally, second-class lanterns equipped with less intense 9–10 candle burners were considered for Kraków.

The pricing structure for gas consumption was defined as follows: For private consumers, the price of 1,000 cubic feet (about 28.3 cubic meters) of gas was set at 6 guilders (equivalent to 4.60 thalers) in Kraków and Lviv and 3.30 rubles (equivalent to 3.60 thalers) in Warsaw. For gas used in public lighting, an annual fee of 18.50 rubles per burner was introduced in Warsaw, and in Kraków, it ranged between 28 (equivalent to 21.54 thalers) and 56 guilders (equivalent to 43 thalers) depending on the burning time and the class of lantern. In Lviv, a fee of 5 guilders (equivalent to 3.84 thalers) per 1,000 cubic feet of gas was specified for public lighting. The contracts also included provisions for tariff reductions when gas consumption surpassed a certain threshold. Consequently, the population potential of Warsaw allowed for more favorable gas tariffs to be negotiated. As a result, in Warsaw, the investor was incentivized to finance the purchase of materials for laying the gas pipelines and installing the lanterns. Conversely, the smaller cities of Kraków and Lviv agreed to cover one-third and half of these costs, respectively.

Von Unruh, overseeing the gasworks' construction, initially assumed that gas demand would peak shortly after production started, and thereafter, it would either plateau or decrease. However, contrary to this projection, the actual demand exceeded expectations and continued to grow post-production initiation.[30] Notably, Warsaw's anticipated annual gas demand of 30 million cubic feet turned out to be 50 million cubic feet in reality. Consequently, the construction of the gasworks in Warsaw became the most expensive investment for the DCGG, amounting to half a million thalers.[31] The need to build larger gas plants to meet the surging demand exceeded the capital that could be raised from share sales, leading to the generation of significant debt. By 1857, the debt had reached 350,000 thalers, and after the opening of the gasworks in Lviv and Nordhausen a year later, it surged to nearly 618,000 thalers.[32] To address this debt, the company planned a further issue of shares. However, this plan was thwarted by the financial crisis of November 1857, triggered by speculation in debt securities, which were increasingly offered as unsecured credit.[33] As a result, investor confidence in industrial investment eroded, leading to a decline in DCGG share prices. Despite these financial challenges, the company managed to maintain its financial stability, partly due to Oechelhäuser's social

30 WOLFGANG VON GELDERN: Wilhelm Oechelhäuser als Unternehmer, Wirtschaftspolitiker und Sozialpolitiker, München 1971, p. 10.

31 Managerial Report for the Year 1856 (as in footnote 19), fol. 7.

32 Die Entwicklung der Deutschen Continental-Gas-Gesellschaft, p. 11.

33 The causes of this global economic crisis are discussed by, among others: GERHARD AHRENS: Die Überwindung der hamburgischen Wirtschaftskrise von 1857 im Spannungsfeld von Privatinitiative und Staatsintervention, in: Zeitschrift des Vereins für Hamburgische Geschichte 64 (1978), pp. 1–29, here pp. 5–8.

connections, which facilitated a loan from A. Schaaffhausen'scher Bankverein in Cologne. Simultaneously, a dedicated committee presented a comprehensive financial report to the shareholders in 1858, demonstrating the company's profitability and potential for future profits. This was further supported by the company's ability to declare a 6 percent dividend just one year later.[34]

As a consequence of the financial crisis, Neulandt, one of the three directors responsible for DCGG's finances, decided to resign. Subsequently, in March 1858, the company's articles of association were amended, and during the shareholders' meeting, Oechelhäuser was elected as the sole director general. He adopted a cautious approach, refraining from entering into new contracts, and instead, focused on enhancing the capacity of the existing commissioned gas plants.[35] The director faced the challenge of balancing the need for gas plant expansion with the risk of potential loss of profits. This potential loss was due to excessive expenditure on plant expansion, which could prevent the company from amortizing its increasing share capital before the expiration of the obtained concessions. The situation was further complicated by von Unruh's acceptance of the assumption of gasworks into the ownership of the respective towns. Therefore, in the 1860s, Oechelhäuser concentrated on addressing this disadvantageous condition by negotiating new agreements with the cities. These agreements aimed to ensure that the ownership of the gasworks would remain with the DCGG even after the expiration of the concessions in exchange for a reduction in tariffs. To achieve his negotiating goals, Oechelhäuser employed a two-pronged strategy. Firstly, he activated larger customers who were enticed by the reduced gas prices and encouraged them to exert pressure on municipal decision-makers. Secondly, he attempted to convince the municipal authorities that immediate tariff reductions would outweigh the future value of the gas plants to be handed over to the cities after several decades.[36] The director general successfully reached agreements with most cities, particularly during the economic prosperity between 1866 and 1873. During this period, both municipal administrations and private consumers demanded lower gas prices and an expansion of gasworks and pipeline networks to enhance gas availability.[37]

In line with its business policy, the DCGG initiated proposals to amend the terms of existing contracts with the magistrates of Warsaw and Lviv in 1864 and with the magistrate of Krakow four years later.[38] In 1866, the Warsaw mag-

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34 Die Entwicklung der Deutschen Continental-Gas-Gesellschaft, p. 12; GELDERN, pp. 9, 13–14.

35 OECHELHÄUSER, p. 156; KLASS, p. 26; KÖRTING, p. 121.

36 GELDERN, pp. 10–11.

37 Die Entwicklung der Deutschen Continental-Gas-Gesellschaft, pp. 7, 21; KÖRTING, p. 122; BRUNCKHORST, pp. 43–44.

38 Zbiór przepisów administracyjnych Królestwa Polskiego, p. 681; Sprawozdanie komisji rady miejskiej, 1871, pp. 2–3; TOMASZ DYWAN: Przemysł gazowniczy we Lwowie w latach 1856–1914: Przyczynek do dziejów industrializacji miasta [The Gas Industry in

istrate, in conjunction with the Administrative Council overseeing it, decided to enter into an additional contract that removed the provision for the city to take over the gasworks upon the expiration of the concession. However, the condition obligating the concessionaire to remove the gas pipelines and lanterns at its own expense, in the event of the city choosing to introduce free competition, was retained. In return, the DCGG committed to expanding the gas network throughout the city at its own expense. This expansion was particularly significant for municipal decision-makers, who sought to extend the gas supply to the Praga district after constructing the Alexander Bridge (also known as Kierbedź Bridge), which would enable laying the gas pipeline to the right side of the Vistula.[39] Although the existing street-lighting charge remained unchanged, the Dessau company gradually reduced the gas price for private consumers, eventually reaching 2.35 rubles (equivalent to 2.20 thalers) per 1,000 cubic feet of gas.[40] This favorable tariff led to an increase in demand. Consequently, between 1866 and 1872, annual gas production in Warsaw surged from over 2 million cubic meters to over 4 million cubic meters, representing 30 percent of the total gas production from all the company's gasworks (Tab. 1). During this period, gas lighting started to become more prevalent in trade establishments, shops, and private homes.[41]

In the 1860s, the authorities of Lviv and Kraków were deeply engaged in the reorganization of city self-government, aligning with the liberal political reforms of the monarchy. Consequently, the municipalities (*Gemeinden*) were officially recognized as distinct legal and economic entities, endowed with broad areas of autonomous action. The proposal to renegotiate the contract with the DCGG was thoroughly examined by committees designated "for the gas issue," comprising members appointed by the city councils that had been elected according to the rules outlined in the Statutes of 1866 for Kraków and 1870 for Lviv.[42] The Lviv Gas Commission, on two occasions (in 1871 and

Lviv in 1856–1914: A Contribution to the History of the City's Industrialization], in: Roczniki Dziejów Społecznych i Gospodarczych 74 (2018), pp. 91–125, here pp. 99–100.

39 Kwestia gazowa w Warszawie [The Gas Issue in Warsaw], in: Przegląd Techniczny 16 (1882), 1, pp. 5–8; 3, pp. 51–54, here p. 6; ADOLF SULIGOWSKI: Warszawa i jej przedsiębiorstwa miejskie [Warsaw and Its Municipal Companies], Warszawa 1903, p. 24.

40 For the content of the supplementary contract see: Zbiór przepisów administracyjnych Królestwa Polskiego, pp. 701–729. The provisions of this agreement were also discussed in: Kwestia gazowa w Warszawie, pp. 5–6; HENRYK RADZISZEWSKI: Warszawa. Vol. 2: Gospodarstwo miejskie [The Urban Economy], Warszawa 1915, pp. 49–52.

41 Managerial Report for the Year 1872, in: LASA, DCGG, sign. 2: Geschäftsberichte des Direktoriums (1866–1875), fol. 109.

42 The consequences of the establishment of a separate municipal government in the Cisleithanian part of the monarchy are discussed by: PETER URBANITSCH: Functions and Tasks of the Municipal Government in the Monarchy, in: JACEK PURCHLA (ed.): Mayors and City Halls: Local Government and the Cultural Space in the Late Habsburg Monarchy, Cracow 1998, pp. 11–23. For detailed information on the establishment of the Lviv city government, cf.: HEIDI HEIN-KIRCHER: Die Entwicklung der Lemberger Selbstver-

1877), recommended extending the concession to the DCGG until the end of 1898. The committee members, delegated from among the councilors, perceived the proposal, which entailed reducing the gas price and expanding the gas pipeline network in exchange for relinquishing the right to take over the gasworks, as beneficial for the city.[43] However, these recommendations encountered resistance from the majority of councilors, who argued that "short-term benefits should not be obtained at the expense of placing future generations at the mercy of a foreign company driven solely by its pursuit of profit based on shares."[44] Some councilors voiced their concerns that the proposal to extend the contract lacked sufficient justification.[45] In particular, Julian Czerkawski emphasized that the apparent one-million-guilder savings to be achieved by 1898 through a tariff reduction overshadowed the potential profits that the city could gain from introducing free competition. He further highlighted that an increasing number of towns were opting to produce gas independently, even at lower tariffs compared to the gas companies. Due to these raised doubts and concerns, the councilors instructed the gas committee to conduct a comprehensive analysis regarding the possibility of buying out or taking over the gasworks in accordance with the provisions stipulated in the existing 1856 contract.[46]

In 1871, the Kraków gas commission took a divergent stance from that of its Lviv counterpart. The commissioners, who were elected from among the councilors, asserted that "the proposed changes to the contract for the municipality of our city are not only not beneficial but, on the contrary, as harmful as possible."[47] The report presented to the councilors raised suspicions that the DCGG had intentionally provided understated information regarding the income generated from the Kraków gas plant. Furthermore, a reference was made

waltung im Rahmen der habsburgischen Gemeindeordnung von der Revolution 1848 bis zur Verabschiedung des Statuts 1870, in: MARKUS KRZOSKA, ISABEL RÖSKAU-RYDEL (eds.): Stadtleben und Nationalität: Ausgewählte Beiträge zur Stadtgeschichtsforschung in Ostmitteleuropa im 19. und 20. Jahrhundert, München 2006, pp. 83–105, here pp. 93–97; TOMASZ ŁUKASZ SROKA: Rada Miejska we Lwowie w okresie autonomii galicyjskiej 1870–1914: Studium o elicie władzy [The City Council in Lviv during the Period of Galician Autonomy, 1870–1914: A Study on the Governmental Elite], Kraków 2012, pp. 80–87.

43 DYWAN, Przemysł gazowniczy, p. 100.

44 Proceedings of the 2nd Section of the City Council for the Gas Issue [1882], in: Derzhavnii arkhiv L'vivs'koi oblasti (DALO) [State Archive of the Lviv Region], Magistrat goroda Lvova (fond 3) [Magistrate of the City of Lviv], opis 1, sprava 3425: Delo o proverke kontrakta mezhdu Magistratom i Nemetskim kontinental'nym obshchestvom v Dessave na provedenie gazovogo osveshcheniia v gorode (1886) [Case File about the Verification of the Contract between the Magistrate and the German Continental Society in Dessau for Gas Lighting in the City (1886)], fol. 7–17, here fol. 9.

45 Gazeta Narodowa from 1871-07-07.

46 Gazeta Narodowa from 1871-07-10 to 1871-07-11; DYWAN, Przemysł gazowniczy, pp. 100–101.

47 Sprawozdanie komisji rady miejskiej, 1871, p. 6.

to an opinion of the Association of Austrian Engineers, prepared on behalf of the Vienna magistrate, which also contemplated acquiring the ICGA gasworks and highlighted that "only with gas production in its own administration can the interests of the city be reconciled with those of private individuals."[48] The councilors were faced with the challenging task of evaluating whether they could effectively manage a gas production company under their administration. The *Journal für Gasbeleuchtung* recommended seeking the counsel of independent experts in such situations, as their knowledge and experience could aid in making the right decision.[49] However, in the two reports analyzed, this step was not taken, leaving apparent ambiguity in the commissioners' recommendations. On the one hand, they advocated accepting the DCGG's proposal in Lviv, while on the other hand, they suggested rejecting it in Kraków without providing a comprehensive analysis of the gas supply issue.

Year	**Warsaw**		**Lviv**		**Kraków**		Production from all DCGG gas plants
	production	No. of gas burners	production	No. of gas burners	production	No. of gas burners	
1857	155,290	1506	–	–	–	–	1,825,509
1858	724,040	4509	143,157	2,110	371,193	2,099	3,543,512
1859	880,742	6270	277,174	2,670	316,429	2,735	4,066,953
1860	1,059,007	8500	302,000	3,027	374,031	3,254	4,504,324
1861	1,207,705	9488	353,394	3,503	379,937	3,600	4,888,350
1862	1,272,036	10,676	385,000	4,320	382,605	3,800	5,198,986
1863	1,288,813	11,323	419,151	4,535	405,087	4,029	5,533,197
1864	1,451,086	13,818	451,196	4,687	400,330	4,298	6,128,222
1865	1,959,426	16,363	477,899	4,937	399,620	4,534	7,130,050
1866	2,166,988	18,281	445,036	5,632	436,962	4,662	7,786,706
1867	2,431,646	19,889	459,043	6,172	441,977	4,411	8,427,112
1868	2,704,002	22,606	505,384	6,119	449,970	4,401	9,198,289
1869	2,882,898	25,461	533,936	6,354	481,932	4,720	9,792,898
1870	3,240,729	28,220	568,779	7,263	487,358	4,906	10,509,430
1871	3,677,502	30,798	605,571	7,532	519,317	5,197	11,822,838
1872	4,064,751	33,851	698,151	8,281	580,993	5,432	13,565,812

48 Ibid., pp. 4, 11.

49 Gemeindegasanstalten oder Privatbetrieb?, p. 339.

1873	4,513,636	35,867	763,959	8,468	620,977	5,450	15,414,421
1874	4,895,455	38,756	783,285	8,826	626,681	5,837	17,119,060
1875	5,457,890	42,442	845,420	9,292	614,895	6,062	18,515,532
1876	5,896,964	45,819	926,109	10,147	632,090	6,112	19,577,784
1877	6,334,683	48,742	958,711	10,436	657,210	6,275	19,577,784
1878	6,859,991	53,147	984,806	10,480	674,879	6,548	20,034,793
1879	7,419,374	57,613	943,107	11,265	663,199	6,607	20,149,754
1880	8,087,391	63,008	997,912	11,665	678,741	6,886	21,510,240
1881	8,915,185	69,146	997,111	12,175	707,428	7,137	23,003,774
1882	9,378,596	73,381	951,346	11,601	818,251	7,557	24,335,537
1883	11,026,690	79,937	973,555	9,068	934,433	7,857	28,907,812
1884	12,178,014	86,064	1,008,804	9,286	902,526	7,932	29,486,133
1885	12,980,762	90,806	1,059,049	9,540	811,064	8,168	30,554,848
1886	12,990,762	96,185	1,029,178	9,062	–	–	29,079,816
1887	12,891,168	98,851	1,070,467	9,209	–	–	30,042,753
1888	12,795,404	103,152	1,049,180	9,481	–	–	30,142,387
1889	13,592,064	106,791	993,750	10,169	–	–	n.d.
1890	13,889,520	107,396	1,101,380	10,956	–	–	n.d.
1891	14,638,600	111,760	1,231,910	12,713	–	–	n.d.
1892	15,580,952	117,683	1,428,540	13,939	–	–	n.d.
1893	16,934,553	122,402	1,627,780	15,130	–	–	n.d.
1894	17,780,310	130,513	1,844,520	15,904	–	–	n.d.
1895	18,641,630	136,794	1,782,590	16,691	–	–	n.d.
1896	19,851,910	144,135	1,852,520	18,050	–	–	n.d.
1897	20,925,700	n.d.	1,988,770	n.d.	–	–	n.d.
1898	22,688,600	n.d.	1,247,590	n.d.	–	–	n.d.
1899	25,099,000	–	–	–	–	–	n.d.
1900	27,057,700	–	–	–	–	–	n.d.

Tab. 1: Production (in cubic meters) of the DCGG gas plants in Warsaw, Lviv, and Kraków together with the number of gas burners supplied.[50]

[50] LASA, DCGG, sign. 1–4 [n.d. = no data available].

There are notable differences in the relationship between the Galician cities and Warsaw with the DCGG as the concessionaire. In Warsaw, the DCGG worked in close cooperation with the municipal authorities significantly expanding the gas pipeline network, resulting in the supply of noticeably higher-quality gas.[51] The company also demonstrated the pioneering use of oven heating through separate fireplaces called generators, adopted during the modernization of the Warsaw gasworks 1878/79.[52] This development involved extending the gasometers and constructing a third retort house.[53] As a result, the plant became the largest gasworks in the DCGG, capable of producing 10 million cubic meters of gas annually, accounting for nearly half of the total gas production of the company (Tab. 1, Fig. 1). On the other hand, in the late 1870s and early 1880s, conflicts arose between the Galician cities and the DCGG. While the initial lighting effect was deemed satisfactory upon the gasworks' operation,[54] disillusionment set in among residents 20 years later due to insufficient gas lighting. Press reports emphatically described this situation as the "bondage of Egyptian darkness."[55] Consequently, city officials began testing the gas demand of the lanterns and the intensity of the light emitted, finding the parameters to be lower than stipulated in the existing contracts.[56] Additionally, outrage spread when municipal officials were denied access to the income and expenditure records of the gasworks, a common procedure employed by gas companies, including the ICGA, with German cities.[57] The lack of certainty hindered the desire to take over the gasworks. As discontent grew, another concern emerged—the fear that the introduction of German technology in the Galician cities would lead to the economic exploitation of the inhabitants. The liberal-democratic Lviv daily *Gazeta Narodowa* highlighted that the contract concluded by the "German" mayor exposed "the people of the city of Lviv [...] to exploitation from which they cannot protect themselves." Attempts were

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51 ANNA SŁONIOWA: Początki nowoczesnej infrastruktury Warszawy [The Beginnings of Warsaw's Modern Infrastructure], Warszawa 1978, p. 111.

52 Die Entwicklung der Deutschen Continental-Gas-Gesellschaft, p. 26; cf.: KÖRTING, pp. 187–188.

53 Reports from the company's management refer to the modernization of the ovens of two existing retort houses, the construction of a third retort house with 12 ovens, and a fourth gasometer, see: Managerial Reports for the Years 1878, 1879, and 1880, in: LASA, DCGG, sign. 4: Geschäftsberichte des Direktoriums (1876–1890), fol. 41, 58, 91; PIOTR JANUSZEWSKI: Historia gazowni warszawskich, ich rozwój techniczny w stosunku do rozwoju gazownictwa zachodniego [History of the Warsaw Gasworks, Their Technical Development in Relation to the Development of the Western Gas Industry], in: Przegląd Gazowniczy i Wodociągowy 5 (1925), 11, pp. 465–469; 12, pp. 522–534, here pp. 526–527.

54 Czas from 1858-12-23; Gazeta Lwowska from 1858-09-10.

55 Quotes from the Kraków newspaper *Czas* are mentioned by: MLECZKO, p. 23.

56 Kurjer Lwowski from 1883-04-26 and 1884-03-30.

57 MLECZKO, pp. 23–24; DYWAN, Przemysł gazowniczy, p. 101. Also cf.: BRUNCKHORST, p. 41.

made to convince artisans and merchants to abandon the services of the Dessau operator and explore alternative methods of obtaining gas from oil in small backyard gasworks.[58] As the end of the concession approached, a slight majority in the city councils of Kraków and Lviv opposed the DCGG's anticipated changes to the contract terms. In response to this stance, Oechelhäuser asserted his commitment to "strictly adhere to the contracts [...] ruthlessly pursuing all claims."[59]

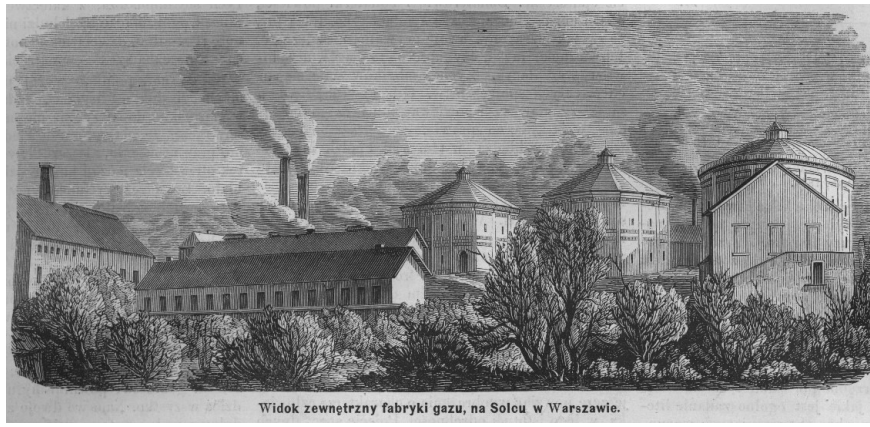

Fig. 1: View of the DCGG gasworks in Warsaw on Ludna Street, in: Tygodnik Ilustrowany (1881), 167, p. 229

Should "German" Gasworks Be Municipalized?

Warsaw, Lviv, and Kraków made an effort to explore the intricacies of the gas production business as the expiry date of the DCGG concession approached. Kraków and Lviv, according to the terms of the agreements, had greater room for maneuver: they could introduce free competition, buy out the gasworks or extend the concession for 15 years, and take over the plants. Warsaw, under a supplementary agreement of 1866, was deprived of the very last option. On the other hand, it had a better negotiating position thanks to its population and industrial potential.

In the case of Kraków, the city council sent a gas commission led by the director of the city construction, Maciej Moraczewski, to Breslau (Wrocław), Dresden, and Prague. After visiting the municipal gas plants in these cities, the commissioners decided that it would be most beneficial for Kraków to establish its own gasworks. Despite the skeptical votes of some councilors, the majority of the remaining councilors voted in favor of their recommended proposal on

58 Gazeta Narodowa from 1875-11-07. 1848–1858 the mayor of Lviv was Karl Höpflinger von Bergendorf.

59 Managerial Report for the Year 1875, in: LASA, DCGG, sign. 4, fol. 6–7.

15 September 1881 and terminated the DCGG's concession.[60] This step by the council led to the Dessau company lowering its tariffs while at the same time making an offer to enter into a new contract. The majority of councilors were unwilling to agree to waive the city's right to take over the plant and the operator's free expansion of the network, even at a further reduction in gas prices. Wanting more time to prepare for the construction of their own gasworks, a temporary solution was chosen—a two-year extension of the contract with the DCGG under the terms of the 1856 contract.[61] At the same time, the gas commission negotiated with the concessionaire to buy out the gas plant in use. Under the terms of the 1856 contract, the buyout price was set based on 16 times the average profit of the plant over the last ten years of operation, which amounted to more than 800,000 guilders. Meanwhile, the actual value of the gasworks was estimated at less than half this amount.[62] Faced with the rigid stance of the DCGG, the representative of the gas committee, Faustyn Jakubowski (1837–1898), convinced the city council to stop lighting the streets with gas from 1 November 1884 and to use petroleum lamps instead.[63] The conservative newspaper *Czas* explained to residents complaining about the anachronistic lighting that this drastic step was necessary "for the good of the city" in order to force the DCGG to decommission its gas pipelines.[64] The policy of the city's decision-makers was supported by Kraków's craftsmen and merchants, as evidenced by the reduction in their intake of "German" gas.[65]

The boycott tactic, coupled with the steps to build its own gasworks, prompted another offer from the DCGG to enter into a new contract. This proposed a special annual discount of 5,500 guilders for the city's public lighting, equivalent to approximately 30 percent of the associated costs.[66] However, the councilors were no longer receptive to such incentives, as public sentiment was unfavorable towards a private operator profiting within the city. The options were to buy out the gasworks or build a competing municipal utility. Understandably, city officials had no experience in building and operating gasworks. Therefore, at the beginning of 1885, the gas commission consulted the director of the Prague municipal gasworks, Christian Friedrich Jahn. He informed the Kraków delegates that not only the Prague gasworks but also other municipal

60 Dziennik rozporządzeń dla król. stoł. miasta Krakowa [Journal of Regulations for the Royal Capital City of Kraków], Kraków 1881, p. 66; Czas from 1881-09-17.

61 Dziennik rozporządzeń dla król. stoł. miasta Krakowa, Kraków 1882, pp. 47, 57, 69–70; Czas from 1882-11-01 and 1882-12-01. Also cf.: MLECZKO, pp. 27–28.

62 MLECZKO, p. 27.

63 Dziennik rozporządzeń dla król. stoł. miasta Krakowa, Kraków 1884, p. 154; Czas from 1884-10-07.

64 Czas from 1884-11-04.

65 MIECZYSŁAW SEIFERT: Historia rozwoju krakowskiej gazowni miejskiej [History of the Development of the Kraków Municipal Gasworks], in: Przegląd Gazowniczy i Wodociągowy 4 (1924), 5, pp. 129–136, here p. 129; MLECZKO, p. 28.

66 Dziennik rozporządzeń dla król. stoł. miasta Krakowa, Kraków 1885, p. 15; MLECZKO, p. 30.

gasworks in German cities were well-managed and profitable and that the use of gas was steadily increasing. Therefore, Kraków should not be afraid to build its own plant. Jakubowski reported these arguments to the councilors and convinced them to build their own gasworks. Its design, together with the supervision of its construction, was commissioned to Jahn and his associate Josef Krost.[67] The Dessau company tried to discredit these decisions by pointing out that the competition between two gas plants would bring losses to both sides of the dispute. The company's polemic with the city was published in the pages of *Czas* but failed to alter the negative perception of the company.[68] Subsequent negotiations with the city led to an agreement where the DCGG consented to sell the gas plant based on an estimate of the company's real value provided by two experts. Director Jahn was appointed to this task and, following an inspection of the Kraków gas plant, confirmed that its technical equipment was in good condition and was suitable for continued production. The councilors proceeded to buy out the gasworks for a negotiated sum of 460,000 guilders, and the relevant agreement was finalized on 13 February, with the plant placed under municipal management on 1 March 1886.[69]

In contrast, the municipal government of Lviv did not undertake visits to gasworks in other cities. In 1881, however, the magistrate's officials looked into the hotly debated issue of using the country's oil for heating and gas production. It can therefore be presumed that the use of this raw material was under consideration if the construction of a municipal gasworks were to be undertaken. Oil, being cheaper than coal and moreover available locally, offered the chance of a significant reduction in production costs, as evidenced by the practice of degassing oil at the Stanisławów (Ivano-Frankivsk) and Tarnów gasworks.[70] Supporters of the introduction of municipal competition for the DCGG were engineers affiliated with the Galician Polytechnic Society. A municipal gasworks offered them the chance to gain experience, which was particularly

67 Dziennik rozporządzeń dla król. stoł. miasta Krakowa, 1885, pp. 79–80, 95, 107.

68 The arguments raised by both sides are discussed by: MLECZKO, p. 33.

69 Dziennik rozporządzeń dla król. stoł. miasta Krakowa, Kraków 1886, pp. 52, 55–56, 60; SEIFERT, p. 130; MLECZKO, pp. 33–34.

70 Correspondence with Tarnów Gasworks, 1881-02-04, in: DALO, fond 3, opis 1, sprava 2961: Delo o perehode gazovogo predpriiatiia v sobstvennost' goroda (1877–1896) [Case File about the Transfer of the Gas Company into the Ownership of the City (1877–1896)], fol. 32–38; Correspondence with the Magistrates of Stanisławów and Tarnów, 1881-12-13 and 1881-12-14, in: DALO, fond 3, opis 1, sprava 3168: Otchety komissii pri gorodskom sovete o gazovom osveshchenii goroda (1881–1882) [Reports of the Commission under the City Council on Gas Lighting in the City (1881–1882)], fol. 4–9. The benefits of degassing oil under Galician conditions were elaborated on by: BRONISŁAW PAWLEWSKI: Technologia nafty i wosku ziemnego [Petroleum and Soil Wax Technology], Lwów 1891, pp. 257–264.

important in the conditions of poorly industrialized Galicia.[71] A representative of this milieu was Roman Gostkowski (1837–1912), who was educated at the Imperial and Royal Polytechnic Institute (k.k. Polytechnisches Institut) in Vienna and was a railway specialist who was also interested in gas and electricity.[72] When he was elected to the city council in 1880, he pointed out that in view of the necessity to hand over the gasworks to the city after 15 years, the DCGG would not be willing to apply innovations in gas production in Lviv and thus expand the plant. He believed that after that time the city would take over a depleted gas plant where capital-intensive investments would have to be made. These arguments failed to convince the councilors, who, without any opposition, voted on 20 July 1882 to extend the DCGG concession for 15 years until 1898.[73] The lack of understanding of the technician's arguments must be explained by caution and even reluctance to take the risk of indebting the city in order to build a competing gas plant. Buying out the plant according to the analogous terms of the 1856 contract as in Kraków was also out of the question. The sum of over a million guilders demanded by the concessionaire far exceeded the plant's actual value.[74] Dissatisfaction with the services of the private operator did not, in this case, lead to a boycott of the "German" gasworks. The middle class and intelligentsia, who elected the city councilors until the last decade of the nineteenth century, advocated a frugal budgetary policy, which ruled out an over-active investment policy for the city.[75] To the decision-makers of Lviv, a patient wait until the takeover of the gasworks in 1898 appeared to be the "lesser evil."[76]

Warsaw's amicable relations with the DCGG were explained by the fact that deprived of self-government, the city, which was overly subject to the control of the Governor-General of Warsaw and the Russian government, was unable to take an assertive stand against the expectations of the concession holder.[77] The decision-making process concerning the expiring concession became in-

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71 Henryk Baum: Kilka słów w kwestii zakupu zakładu gazowego przez gminę miasta Lwowa [A Few Words about the Purchase of the Gas Plant by the Municipality of the City of Lviv], in: Dźwignia 5 (1881), 3, pp. 33–35; 4, pp. 40–41.

72 Kamila Cybulska: Roman Gostkowski—uczony europejskiej miary [Roman Gostkowski—A Scholar of European Caliber], in: Lidia Michalska-Bracha, Małgorzata Przeniosło (eds.): Znani i nieznani dziewiętnastowiecznego Lwowa: Studia i materiały, vol. 5, Kielce 2017, pp. 43–70, here pp. 48–49, 56–63.

73 Gazeta Narodowa from 1882-07-22; Dywan, Przemysł gazowniczy, pp. 101–102.

74 Proceedings of the 2nd Section of the City Council for the Gas Issue (as in footnote 44), fol. 10.

75 Sroka, pp. 130–132; Hein-Kircher, Lembergs "polnischen Charakter" sichern, pp. 152–154.

76 Proceedings of the 2nd Section of the City Council for the Gas Issue (as in footnote 44), fol. 17.

77 Suligowski, Pisma, pp. 287–288; Gajewski, p. 130. The Russian government pursued a policy of limiting the powers of municipal authorities from 1843 onwards, as discussed by, among others: Szczypiorski, pp. 29–30; Słoniowa, pp. 56–59.

tricate due to the involvement of two "bicameral" authorities: the magistrate, led by the mayor and the *Oberpolizeimeister*, and the Governor-General and the Russian government.[78] The complexity of these relationships became evident in 1875 when the tsar appointed Sokrat Starynkevich, a Russian artillery engineer and army general, as the mayor. Starynkevich was an ambitious official who immediately engaged in systemic infrastructure projects, successfully overcoming the challenges arising from limited competence and resources. In Polish historical memory, he gained recognition as the modernizer of Warsaw to whom the city owes its modern water supply and sewage systems.[79]

Regarding the "gas issue," Starynkevich undertook a strategy similar to that of Kraków, simultaneously negotiating the terms of an extension of the concession and threatening to terminate it, as evidenced by the commencement of planning work for the construction of a municipal gasworks. The Warsaw press, apart from the conservative *Gazeta Polska*, supported the mayor's actions, enthusiastic about removing the private gas operator.[80] Starynkevich sought guidance from William Lindley, the designer of Warsaw's water supply and sewage system, and engaged August Hegener, director of the municipal gasworks in Cologne, to assess the profitability of constructing a municipal gasworks.[81] Hegener had prior experience in modernizing the ICGA's plants in Cologne, which had already been bought out by the city, and constructing a new gasworks in the Ehrenfeld district.[82] While the mayor and technocratic magistrate were in favor of establishing a municipal competitor to the DCGG, the "eminent" citizens involved in the decision-making process were concerned about the city's potential excessive debt. Representatives of the Warsaw bourgeoisie and middle class, with the exception of Julius Wertheim, opposed the mayor's initiative.[83] The Dessau company capitalized on this difference of opinion and offered to reduce tariffs (including significant reductions for public lighting) and even share profits with the city. This gesture was welcomed by the Warsaw Governor-General and the Ministry of Internal Affairs, who supported the residents' representation. As a result, the higher authorities decided against the construction of a municipal gas plant, deeming it unnecessary when an already operating company with a developed plant had shown generosity to

78 ROLF, pp. 197–198.

79 Ibid., pp. 202–206.

80 As referred to by: SULIGOWSKI, Pisma, p. 291; RADZISZEWSKI, pp. 54–56; SŁONIOWA, p. 113.

81 Kwestia gazowa w Warszawie, pp. 6, 51; SULIGOWSKI, Pisma, pp. 289–291.

82 E. GENZMER: Die Beleuchtungs-Anlage, in: Köln und seine Bauten: Festschrift zur VIII. Wanderversammlung des Verbandes deutscher Architekten- und Ingenieur-Vereine, Köln 1888, pp. 270–282.

83 Kwestia gazowa w Warszawie, p. 8; SULIGOWSKI, Warszawa, p. 37; RADZISZEWSKI, p. 60.

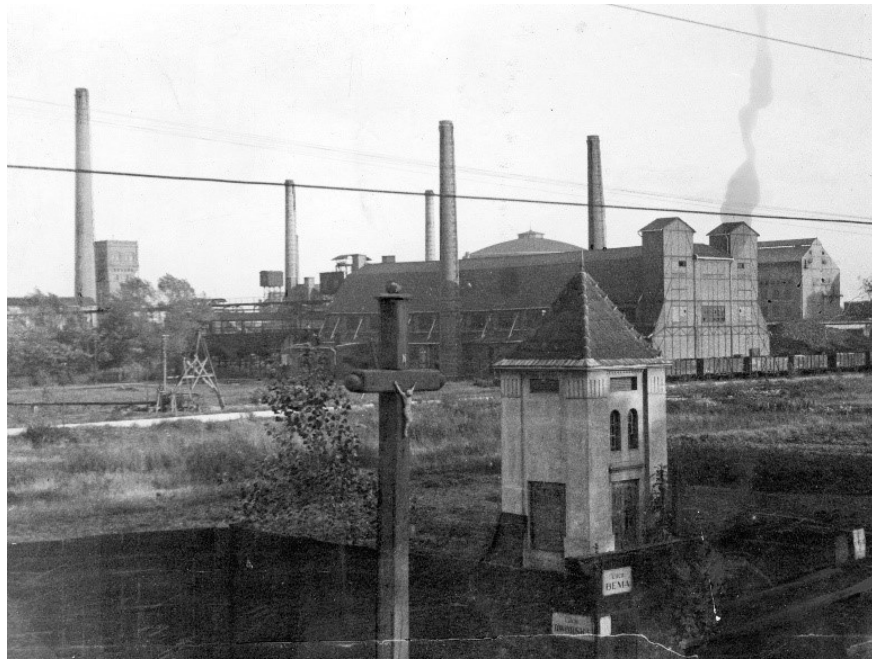

Fig. 2: View of the DCGG gasworks in Warsaw in the Wola district, photograph from 1931, collections of National Digital Archive in Warsaw

the city.[84] The mayor's proactive approach failed to break the resistance of the superior authorities, as it did in the case of the water and sewage works.

In 1883, the Dessau-based company secured its position in Warsaw by concluding a new 23-year contract. The concession was acquired under an attractive public lighting tariff, which, during the 1880s, only covered production costs. However, the DCGG aimed to increase consumption significantly to capitalize on profits from private consumption.[85] To achieve this, the concessionaire made a strategic decision to construct a second, much larger gas plant connected to the railway network. The construction of this 1.4-million-ruble investment was undertaken near the freight station of the Warsaw–Vienna Railway in the Wola district and was completed after three years in October 1888 (Fig. 2).[86] As a result of this expansion, the two Warsaw gasworks of the DCGG were able to enhance their production capacity from 12 to 27 million cubic meters by 1900, accounting for nearly half of all the output from DCGG

84 SULIGOWSKI, Pisma, pp. 292–293; SŁONIOWA, pp. 114–115.

85 Managerial Report for the year 1886, in: LASA, DCGG, sign. 4, fol. 200. A provision was then introduced that for the consumption of up to 53 million cubic feet of gas in a year, the city would pay a flat rate of 38,000 rubles, while above this volume a tariff of 1.15 rubles per 1,000 cubic feet would apply; RADZISZEWSKI, p. 61.

86 Managerial Report for the Year 1888, in: LASA, DCGG, sign. 4, fol. 230; GAJEWSKI, pp. 129–130.

gasworks (Tab. 1). The establishment of a new plant provided an opportunity for the gasworks management to establish the company's image as a contributor to the modernization of Warsaw. Indeed, the new plant was designed to produce higher-quality gas, resulting in more intense and efficient lighting effects upon combustion.[87]

The Gas Industry as Part of Urban Modernization

The determination of the Kraków authorities to acquire the gasworks led to the removal of the concessionaire from the municipal economy. Prior to the acquisition, the municipal authorities sent Mieczysław Dąbrowski (1853–1920), a civil engineer educated at the Kraków Technical Institute, to gain experience at the Prague municipal gasworks. Subsequently, he was appointed as director of the purchased gasworks by the Kraków authorities, with a mandate to modernize and expand the facility. This led to a reduction in gas charges in Kraków, resulting in a significant increase in gas consumption from one million to 3.5 million cubic meters in 1900.[88]

Lviv followed a similar path, with the difference that it decided to wait for a free takeover of the gasworks. Meanwhile, the DCGG sought to increase the supply of gas and expanded the Lviv gas plant in the years 1877/78 (Fig. 3).[89] It must be assumed that under the conditions of high tariffs (private consumers paid twice as much for gas in Warsaw at the time), a significant increase in consumption was not expected. Gas consumption remained at one million cubic meters in the 1880s. For that time, we observe an actual decrease in the number of gas burners being used (Tab. 1). The extension was an act of goodwill towards the public and the city's decision-makers. The company, however, failed to overcome its extremely negative image because after the decision to municipalize in 1882, the councilors, with the support of the press and Galician engineers, indignantly rejected another proposal to conclude a new contract with the DCGG four years later.[90] Roman Gostkowski, citing the examples of Kraków and Poznań during a lecture held at the Lviv City Hall in 1888, reassured the city's decision-makers that the right course of action had been taken, despite having to endure high gas prices until 1898.[91]

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87 Słoniowa, p. 235.

88 Seifert, pp. 130–132; Mleczko, pp. 37–44.

89 At that time, the retort house was extended, and a second gasometer was made, see: Tomasz Dywan: Miejskie zakłady i obiekty infrastruktury technicznej Lwowa w latach 1858–1918: Zarys dziejów [Urban Utility Companies and Technical Infrastructure of Lviv, 1858–1918: A Historical Outline], Łódź 2021, pp. 49–52.

90 Gazeta Narodowa from 1886-03-18 and 1886-03-20; Kurjer Lwowski from 1886-03-17.

91 Gazeta Narodowa from 1888-01-16. Poznań was the only city in the former Polish-Lithuanian Commonwealth whose German-dominated authorities had already launched a municipal gasworks in 1856-11-14, built to a design by the English-born engineer John

Fig. 3: View of the DCGG gasworks in Lviv, photograph by Karl Ferdinand Lang from the early 1860s, collections of Ihor and Irina Kotlobulatov

When the gasworks was finally taken over, the city council immediately removed the German director of the plant and appointed a Polish man of Armenian origin, Adam Teodorowicz (1863–1921), who was educated at the Vienna and Zürich polytechnics, to the post.[92] With his help, the city expanded the plant at the beginning of the twentieth century, introducing innovative gas production technologies. However, the option of producing gas from petroleum, considered by city officials twenty years earlier, was not utilized at that time. The city authorities wanted to take over the gasworks in good technical condition. Therefore, in 1891, Lviv, in agreement with DCGG, covered half the costs of replacing the ovens and expanding the gasworks.[93] After municipalization, Teodorowicz decided to use the ovens with generators that had been adapted for coal degasification. By-products of oil refining in the form of heavy petroleum oils were used only for carburizing the water gas produced from the end of 1906. Similar to the earlier situation in Kraków, after the takeover of the gasworks, there was an increase in production in Lviv from over 2 to nearly 7.3 million cubic meters in 1913.[94]

As a consequence of an agreement with the authorities to extend the concession in Warsaw, the DCGG undertook a comprehensive expansion and modernization of its two gas plants. Starting from the mid-1880s, the company stra-

Moore, see: MIRON URBANIAK: Gazownie komunalne Poznania i Lwowa na początku XX w.: Próba charakterystyki i porównania ich rozwoju [Municipal Gasworks in Poznań and Lviv in the Early Twentieth Century: An Attempt to Characterize and Compare Their Development], in: Kwartalnik Historii Nauki i Techniki 64 (2019), 1, pp. 57–75, here p. 59.

92 DYWAN, Miejskie zakłady, p. 55; ŁUPIENKO, pp. 274–275.

93 DYWAN, Miejskie zakłady, pp. 52–54.

94 URBANIAK, pp. 64–67; DYWAN, Miejskie zakłady, pp. 55–69, 99.

tegically focused on broadening the applications of gas and encouraging an increase in gas consumption, particularly for industrial use, by implementing attractive tariffs.[95] To achieve this, the management of the Warsaw gas works initiated the import of gas engines and gas-fired cookers into the city, resulting in a steady rise in gas consumption by both private and industrial consumers. By the year 1900, private consumers accounted for 71 percent of the consumption, while industrial consumers constituted 11 percent. The remaining gas was used for public lighting.[96] The municipalized gasworks in Kraków and Lviv pursued a similar sales strategy during the early twentieth century, aiming to augment private consumer gas usage.

However, looking back over several decades, the Polish intelligentsia and engineers regarded the presence of a private gas operator in Warsaw as a mistake. One prominent voice among this group was the lawyer Adolf Suligowski (1849–1932), who criticized the lack of initiative on the part of the city in managing essential public service enterprises, leading to increased hardship among the workers.[97] There were complaints that instead of contributing to the city's budget, the Warsaw gasworks was generating profits for a foreign company.[98] As observed by Kamil Śmiechowski, a common theme in the discourse on "urban issues" in the Kingdom of Poland during the early twentieth century was attributing various social problems arising from urbanization and industrialization to the absence of self-government.[99] In this context, the presence of Warsaw's largest gasworks under the management of a private operator thus seemed to add to this unfavorable condition. The blame for this state of affairs was often placed on the Russian authorities, who, until the outbreak of World War I, had failed to introduce self-government reform in Vistula Land (Privislinskii Krai).

Conclusion

The analysis of cases from Warsaw, Lviv, and Kraków demonstrates that the development of gas technology, increased gas consumption, and tariff reductions, along with diversified usage, could be achieved under both private and municipal management. However, the transition to municipal ownership of gas plants in Kraków and Lviv hindered these processes, as the concessionaires

95 JANUSZEWSKI, pp. 526–529; cf.: GELDERN, pp. 16–17.

96 SŁONIOWA, p. 306.

97 SULIGOWSKI, Warszawa, pp. 5–6.

98 FELIKS BAŃKOWSKI: Stan sprawy gazowej w Królestwie Polskim, na Litwie i Rusi [The Condition of the Gas Issue in the Kingdom of Poland, Lithuania, and Ruthenia], in: Przegląd Techniczny 48 (1910), 47, pp. 577–579; 51, pp. 627–628, here p. 579; RADZISZEWSKI, p. 76.

99 KAMIL ŚMIECHOWSKI: Kwestie miejskie: Dyskusja o problemach i przyszłości miast w Królestwie Polskim 1905–1915 [Urban Issues: Discussion on the Problems and Future of Cities in the Kingdom of Poland, 1905–1915], Łódź 2020, pp. 105–118.

then prioritized recouping their investments. The competition between these cities was not solely about providing large quantities of affordable gas to their inhabitants, although Warsaw had slightly lower tariffs than the Galician cities. It was primarily about positioning themselves as the driving force behind modernization efforts. The local governments in Kraków and Lviv were hesitant to allow private investors to lead modernization initiatives. Heidi Hein-Kircher demonstrates how Polish self-government "nationalized" Lviv's space, culture, and political discourse.[100] When the city took over the gasworks and other infrastructural investments at the end of the nineteenth century, it was perceived that Lviv's citizens owed these amenities to Polish self-government. Profits generated from the gasworks and other enterprises, such as the slaughterhouse, tramway, and power station, contributed to the city budget. Municipalization thus became a tool for revenue enhancement. Similar arguments were made in the context of Kraków. In this way, Galician cities took inspiration from several German cities that acquired gasworks from private concessionaires. The buyout of the Kraków gasworks was particularly encouraged by the precedent of Prague, where the authorities chose to build their own gasworks in the Žižkov district rather than extending their contract with the Breslau Gas Lighting Company, introducing competition.[101] This development places Lviv and Kraków within the framework of "transnational municipalism" that has been evolving since the late nineteenth century. This concept involves differentiated development of public services provided by cities. Other Galician cities followed this example in the early twentieth century.[102] In contrast, the Russian administration in charge of Warsaw allowed the DCGG and a company operating horse-drawn and later electric trams to operate in the city, opposing the trend towards municipalization. Furthermore, in the cities of the Kingdom of Poland and Russia more broadly, urban modernization projects were typically coupled with private ventures.[103] Interestingly, starting from 1879, the Warsaw authorities focused on constructing modern sanitary facilities, while in Lviv and Kraków, such facilities were not installed until 1900.

100 HEIN-KIRCHER, Lembergs "polnischen Charakter" sichern, pp. 198–213.

101 GERHARD MELINZ, SUSAN ZIMMERMANN: Die aktive Stadt: Kommunale Politik zur Gestaltung städtischer Lebensbedingungen in Budapest, Prag und Wien (1867–1914), in: GERHARD MELINZ, SUSAN ZIMMERMANN (eds.): Wien—Budapest—Prag: Blütezeit der Habsburgermetropolen. Urbanisierung, Kommunalpolitik, gesellschaftliche Konflikte (1867–1918), Wien 1996, pp. 140–176, here pp. 147, 150.

102 ESZTER/HEIN-KIRCHER/HOCHADEL, Searching for Best Practices, pp. 3–5; ŁUPIENKO, pp. 253–258.

103 ROLF, pp. 250–253.

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