Feasting Eyes, Hungry Stomachs, 1917–1920

During 1917–20, Russian society underwent massive upheavals unparalleled since the Time of Troubles three centuries earlier. It was an era of revolution, of terror, of starvation, of epidemics, and of that harshest of conflicts, civil war. In February 1917, the tsarist government disintegrated and a duma-based provisional government ruled until the Bolsheviks seized control in November. From 1918 to 1920, civil war raged, sharpened by foreign intervention and a trade embargo, until ended by the ruthless autarkic mobilization of war communism. Economically, the country deteriorated from bad to worse. Paralleling industry, electricity production dropped sharply in 1918–20 and did not regain prerevolutionary levels until the mid-1920s. Only the extraordinary efforts and creativity of utility workers kept electricity flowing.

Yet these years were also a time of bold visions and utopian dreams that sharply contrasted with the economic and social devastation of the half-deserted cities and hunger-wracked countryside. Planted in 1914–16, the seeds of state electrification now blossomed as the loci of decision making and control shifted from the city and utility to a receptive national government. Electrical engineers created a network of state agencies for electrification and spread the gospel of electrification for societal transformation. By 1920, electrical engineers could claim the establishment of theoretical rationales and organizational frameworks for large-scale electrification, the basis of a political alliance with Lenin and other leaders, and state approval for four regional stations. That visions outdistanced reality and initial plans were unrealistic should not be viewed too harshly: at times, civil war
threatened Petrograd and Moscow, hardly a situation conducive to long-term planning. For the utilities to survive was an impressive technological achievement; the advancement of national electrification was no less an accomplishment in the political realm.

The Provisional Government

The eight months of the provisional government proved a heady and frustrating time for utilities and electrical engineers. Taking advantage of their vastly expanded freedom, electrotechnical organizations flourished inside and outside the government as part of a broader movement of technical specialists into important and often new government positions in a demonstration of the forces supporting the February revolution.¹ The provisional government as well as its rival, the Petrograd City Soviet, continued the wartime increase of state control by advocating a centrally planned economy and establishing the Central Economic Committee “for the coordinated implementation by individual departments and institutes of all measures regulating the economic life of the country.”² As in other areas, the Provisional Government fell short.

The government considered the utilities of Petrograd and Moscow too important to leave to municipal control. In the confused days after the tsar abdicated, the state duma’s executive committee gave the TsVPK electrotechnical section responsibility for the “correct and uninterrupted work” of the Petrograd utilities.³ In the Central Industrial Region, the MTP acted as general overseer.⁴ One function of these new authorities was to work with other government bodies to restrict consumption as fuel supplies worsened. In spring, the military command and the Moscow uprava agreed to cut consumption by a quarter to a half of 1916 levels.⁵ In September, the provisional government imposed severe restrictions on Petrograd and Kiev users, including industry, and required the use of metal filament bulbs instead of the less efficient coal filaments.⁶

¹ Alfred J. Rieber, Merchants and Entrepreneurs in Imperial Russia (Chapel Hill: University of North Carolina Press, 1982), 406.
³ “Otdely Tsentralnogo v.- pr. k-ta.,” Izvestiia TsVPK, 13 March 1917, 4.
The April creation of the MTP Council for Electrotechnical Affairs (SED, Soveshchanie po elektricheskim delam) gave the electrical engineering community its first government foothold. The 22-member SED, headed by VI section president Piotr Osadchii, represented the major electrical organizations and important outside groups. Like many initiatives of the provisional and Soviet governments, the origins of the SED lay in the old regime—in this case, an unsuccessful attempt in the last months of tsarism by the MTP and the VI Section to centralize all state electrotechnical activities in the high-level Section for Electricity (Otdel Elektrichestva). The reluctance of other ministries to surrender their authority resulted in the compromise creation of the SED to “work out exact measures in electrotechnology” and serve as a “base of activities for the future Section for Electricity.”

The SED’s immediate priorities were to create a legal framework for regional stations and to establish the Section for Electricity. It focused on regional stations to “alleviate the current fuel and transportation crisis which will continue until the restoration of peace” and because “the further development of Russian industry must be linked with its electrification.” The rationale for the section was to realize the industrial potential of substituting mechanical for human power, a change possible only by electrification. The West had demonstrated the increasing economic importance of electrification and regional stations; Russia must follow. The MTP section should manage all electrical oversight, including MVD functions, for optimum efficiency. An interdepartmental committee of experts and representatives of concerned organizations, based on French experience, would direct the section.

Like prerevolutionary groups, the SED failed to establish a single, central government organization for electrification, as would other committees in the early 1920s. Although at times a fanatic confounding of organization with implementation, the attempts to seize the commanding bureaucratic heights were a logical response to a government in which one ministry could bury a rival ministry’s proposals in an interdepartmental morass. In a society so heavily dominated by the tsarist—and later Soviet—state, advocates assumed that progress toward the establishment of supportive high-level governmental bodies meant progress toward electrification.

---

7 Including the VI Section, the TsVPK electrotechnical section, the Free Economic Society, zemstvo and city unions, and the Association of Trade and Industry, the last represented by Leonid Krasin; TsGIAL f. 23, op. 27, d. 70, 51.
8 “Ot redaktsii,” Elektrichestvo, 1917, nos. 9–10: 131–32.
10 TsGIAL f. 23, op. 27, d. 70, 24–26, 34–35.
New organizations also formed outside the government. The first congress of electric utilities, suggested in 1915, met in May 1917 and formed the Soiuz elektricheskikh stantsii obshchestvennogo polzovaniia (Union of Electric Stations for General Use).\(^11\) Modeled after the German Vereinigung Deutscher Elektrizatswerke (Union of German Electric Utilities), which contained twenty Russian utilities in 1914, the union spoke for management.\(^12\) Its top priority was to alleviate the utilities' worsening financial situation, with lesser interests in the growing problems of fuel, materials, and labor.\(^13\)

In March and April, electrical engineers from the VI Section established the Union of Electrotechnicians to participate in "the great tasks of national economic reconstruction and growth [and] raising the productivity of national labor."\(^14\) Based on the German Verband Deutscher Elektrotechniker and the American Institute of Electrical Engineers, the union sought to unite all sectors of electrotechnology. Osadchii was elected president, ensuring that the electrical engineering community literally did speak with one voice.\(^15\)

The SED kept extremely busy with new tariffs, taxes, labor questions, and a myriad of other issues.\(^16\) An immediate utility concern, pushed by the Union of Electric Stations, was raising tariffs to cover the increased costs of labor and fuel.\(^17\) The SED also worked on an electrical lighting tax, which set rates by type of use and, most interesting, efficiency.\(^18\) Unlike previous attempts, this tax met with no major objections, reflecting both different circumstances and initiators.

The major legal initiative of the provisional government was a land-
mark law authorizing hydropower and long-distance transmission. In July, the SED published a temporary statute for public discussion, twenty-three years after the first hydroelectric proposal for St. Petersburg.\textsuperscript{19} The statute gave the government ultimate command of all water sources with corresponding rights of estrangement and occupation. An MTP committee for the use of waterfalls would direct development, with some local participation.

Although hailing the statute as a significant advance, critics complained that it failed to protect local governments and to distinguish sufficiently between private and public interests.\textsuperscript{20} The MVD charged that local governments would lose control of the "significant profits" from municipal stations that supported other municipal activities.\textsuperscript{21} These criticisms delayed the statute's approval. A September meeting of the VI Section and Union of Electrotechnicians with the Society for the Study of the City Economy (Obshchestvo izuchenia gorodskogo khoziaistva) conceded the MVD criticism and the need for more exact legal work, but it approved giving the MTP "the authority for industrial projects of state significance," which included the "extremely urgent" and "unobstructed normal development in Russia of networks for electric transmission."\textsuperscript{22} The provisional government approved the temporary statute, but the government's fall precluded action.\textsuperscript{23} Actual implementation did not begin until an August 1919 Soviet statute established administrative responsibilities.\textsuperscript{24}

The provisional government lasted only eight months but laid the institutional groundwork for future state electrification. The formation of the SED, the first high-level government body for electrification, reflected both the rising power of the electrical engineering community and a larger technocratic mindset. Although a sharp jump in support from the tsarist government, the provisional government's actions in many ways continued, not broke with, the trend toward electrification as a state technology. The early years of Soviet rule accelerated this trend as advocates established organizational niches and convinced others of electrification's importance to socialism.

\textsuperscript{19} "Vremennoe polozhenie ob ispolzovanii vodnykh sil," Elektrichestvo, 1917, nos. 9–10: 143–44.
\textsuperscript{20} "Ot redaktsii," Elektrichestvo, 1917, nos. 11–12: 147; nos. 15–16: 181–82.
\textsuperscript{21} TsGIAL f. 23, op. 27, d. 70, 1.
\textsuperscript{22} "Khronika," Elektrichestvo, 1917, nos. 15–16: 184.
\textsuperscript{23} F. I. Nesteruk, ed., Energetitcheskaia, atomnaia, transportnaia i aviatsionnaia tekhnika: Kosmonavtika (Moscow: Izdatelstvo Akademii nauk, 1969), 274.
\textsuperscript{24} "Polozhenie ob ustroistve i ekspluatatsii Elektroperedach," Sbornik dekretov, postanovlenii, rasporiazhenii i prikazov po narodnomu khoziaistvu, 1921, no. 3: 471–74.
The Soviet Government

The new Soviet government struggled on many fronts during the 1918–21 period of war communism. A “heady brew of visionary speculation and hardheaded, desperate measures designed to make the economy work and the Soviet regime survive,” according to Richard Stites, war communism was a command economy based on coercion, centralization of production and distribution, mobilization of labor, requisitioning of peasants’ products, and the elimination of markets.25 The malleability of the economy and the power of ad hoc planning through allocating resources demonstrated by War Communism greatly influenced Soviet planning a decade later.27

A mix of tsarist, World War I, and Marxist elements went into the bouillabaisse of the new government. Commissariats, governed by the cabinet Council of People’s Commissariats (SNK, Sovet narodnykh komissariatov), replaced ministries. The All-Russian Central Executive Committee appointed the council. The Congress of Soviets stood above the SNK, but its infrequent meetings meant that the SNK held the real reins of power. Most relevant to electrification was the December 1917 creation by SNK of the Supreme Council for the National Economy (VSNKh, Vysshii sovet narodnogo khoziaistva), which was charged with organizing the national economy and state finances.28 Although originally envisioned as guidance and planning bodies, the VSNKh and its regional counterparts became control and administration units under the pressures of the civil war, the revolutionary impetus of war communism, and the example of the wartime special councils.29

The VSNKh quickly developed an electrotechnical bureaucracy, the Electrotechnical Section and Elektrostroi within the Committee for State Construction. The Electrotechnical Section (ETO, Elektrotechnicheski otdel), formed in December 1917 to handle the production of electrical energy and the underlying manufacturing base,30 had goals

30 “Khronika,” Narodnoe khoziaistvo, 1918, no. 2: 19. For subsections in 1918, see Man-
Feasting Eyes, Hungry Stomachs, 1917–1920

that ranged far beyond operating existing utilities. The announcement of the ETO’s creation proclaimed that only a network of regional stations could

place the Russian economy on the level demanded by the international situation. . . . For the reconstruction of the national economy after the end of the war, the first question is about receiving inexpensive energy by the directed and the planned [construction] of regional electric stations of high voltage (120,000 V) from “white” (waterfalls), “grey” (peat), and black coal. . . . These plans on a state scale already have been worked out (Germany) or are being worked out in all countries. 31

Three stages of nationalization completed the legal subordination of utilities started in World War I. The new government nationalized Elektroperedacha and the 1886 Company stations in December 1917 and January 1918. 32 The general nationalization of 28 June 1918 covered all utilities with a capital of more than one million rubles. 33 The last stage in 1918–19 extended the reach of the ETO subsection for electric stations, Elektrotok (Electric Current), over state, municipal, concessional, and private stations. This last stage met resistance from the People’s Commissariat of Internal Affairs (NKVD, Narodnyi komissariat vnutrennikh del), which represented city and local authorities loathe to lose control over their utilities. In August 1919, the ETO received authority for power stations, ending a year of struggle over local or central control of utilities. For the moment, the centralizers had won. 34

The ETO did not monopolize state electrification. The VSNKh established the technocratically oriented Committee for State Construction (KGS, Komitet gosudarstvennykh sooruzhenii) in May 1918 to “work out a plan, establish priorities, fulfill and execute state con-


33 “Dannye ot dela upravleniia predpriiateliamr pri kollegii organizatsii proizvodstva VSNKh,” Narodnoe khoziaistvo, 1918, no. 4: 45–46; “Dekrety i postanovleniia po narodnomu khoziaistvu,” Narodnoe khoziaistvo, 1918, no. 5: 68.
struction, and also survey all projects of state construction and general works treated in VSNKh sections." At the behest of the Moscow-based electrical engineering leadership, one of the eight initial KGS sections handled electrotechnical construction and became Elektrostroii (Electric Construction) in October 1918. This success partly stemmed from the fact that Gleb Krzhizhanovskii served as the first KGS director.

Elektrostroii planning subsections united previously independent prerevolutionary projects, such as the electrification of the Donets basin by the nationalized Electric Company for the Donets Basin. The most prominent part of Elektrostroii, at times eclipsing it, was the Central Electrotechnical Council (TsES, Tsentralnyi elektrotekhni­chesskii sovet), formed in October 1918 as "an institute of permanent consultants" using their expertise "for the best and quickest explication of technical and drafting questions about new electrotechnical construction." The TsES was an elite body comprising the same engineers who had formed the SED, the Permanent Committee of the All-Russian Electrotechnical Congresses, and VI Section consulting committees.

Unlike the VI Section committees, the TsES intended to initiate and not just respond. It brought scientists and engineers together to work on defined national needs. Achieving and harnessing this unity was a concern of Soviet leaders, whose efforts and experiments during these years did not always succeed. The TsES gave this cooperation a public prominence, government support, and political power that electrical engineering lacked previously. This prestigious body for elite electrical engineers more than compensated for the effective dis-

---

35 "Vremennoe polozenie o Komitete gosudarstvennykh sooruzhenii V.S.N.Kh. i sostoiashchikh pri nem uchrezhdenniakh," Narodnoe khoziastvo, 1918, no. 5: 70.
38 TsGANKh f. 3429, op. 1, ed. kh. 116 2, 42-44, 48-49; "Skhema VSNKh po Komitetu gosudarstvennykh sooruzhenii," Tekhnika, 1918, no. 4: 22; "K istorii elektrifikatsii RSFSR," Krasnyi arkhiv, 1939, no. 95: 19.
40 P. S. Osadchii, M. A. Shatelen, and A. G. Kogan, "Tsentralnyi elektrotekhni­chesskii sovet za tri goda ego sushchestvovaniia," in Elektrifikatsiia Rossi: Trudy 8 Vserossiiskogo elektrotekhni­cheskogo seznv Moskve 1–10 oktiabria 1921 (Moscow: Gosizdat, 1921), 1, 134.
appearance of the VI Section, which ceased publishing *Elektrichestvo* in 1918 due to shortages of paper and power.\(^2\)

The ETO and Elektrostroi overlapped functionally, a situation typical of the early years of Soviet power. The appointment of Bolshevik Piotr G. Smidovich, who had worked at the 1886 Company Moscow station, to head both bodies minimized potential conflict. Smidovich also served as a member of the Moscow Soviet of Workers and Peasants Deputies, the new municipal duma. In January 1919, a formal division of responsibility stabilized the framework of state electro-technical activities. The ETO received the utilities and manufacturing industries, and Elektrostroi received the authority to construct all powerplants for factories and railroads “having general national or regional significance.”\(^3\)

The KGS, headed by Krzhizhanovskii and guided by its task of construction, advocated national planning: “It is indispensable to have a state plan even for five years ahead—a plan of development of the productive forces of Russia to answer the questions: what needs to be done earlier, what later, and how to do it?”\(^4\) Fuel and transportation shortages impelled early planning schemes to focus on a region and not the country. Ideally, products would be manufactured and consumed locally to maximize regional self-sufficiency and to minimize interregional transport. The concept of the economically autarkic region grew from necessity, not from an inherent superiority of approach; from existing work on regions, particularly the Central Industrial Region; and from the civil war division of the country.\(^5\)

One indicator of the growing widespread interest in electrification beyond the ETO and Elektrostroi was the appearance of other electrification units at the local, regional, and national levels.\(^6\) The ETO established a group in April 1918 to work with the regional councils

\(^{2}\) “Ot redaksii,” *Elektrichestvo*, 1918, nos. 1–2: 1. The 1918 issues were hand-corrected and printed on low-quality paper.


\(^{5}\) Ibid., 3; N. Charnovskii, “Znachenie raionirovaniia promyshlennosti dlia ekonomicheskogo stroitelstva strany,” *Narodnoe khoziaistvo*, 1920, nos. 11–12: 17.

for the economy to “unite all work preparation, project planning, and execution of the electrification of industry in the large sense of the word and operation of regional electric stations.” Planning bureaus were established for the Dniepr, Donets, Ukraine, Siberia, and Caucasus regions, but the more developed Northern and Central Industrial regions advanced the furthest.

Continuing their prerevolutionary concentration of political and economic power, Moscow and Petrograd dominated regional planning. The Northern Region housed the most active planning bureau, which was established in January 1918 to gather information on existing stations and plan future stations. The Commissariats for Land and Communication also contained electrification bureaus to locate energy resources and determine the requirements of existing and potential customers.

The Fuel Crisis

The first years of Soviet power saw the creation of an impressive semicoordinated array of electrification agencies. The problems they faced, however, appeared even more formidable. In 1917–21, the fuel crisis, or “fuel hunger,” dominated economic life as the railroad network nearly collapsed and White forces occupied Russia’s two major energy regions, the Donets coal basin and the Baku oil fields. By 1920, fuel shortages had created a whole series of crises in the economy. Utilities did not escape: output plunged sharply below prewar levels. 

51 Ton-miles dropped by a factor of four between 1917 and 1918 and did not recover 1917 levels until 1923; Transport i sviaz SSSR: Statisticheskii sbornik (Moscow: Gosstatizdat, 1957), 32.
Graph 5.1. Electricity generation in three cities, 1913–21

![Graph showing electricity generation in Petrograd, Kiev, and Rostov-on-Don from 1913 to 1921.](image)


levels (see Graph 5.1). In 1919–20, the major utilities came dangerously close to collapsing. That they did not was a tribute to the engineers and technicians who kept powerplants operating, partly by converting to local fuels.

Although the new state gave utilities priority for fuel, forage, food, and transportation, shortages eased only slightly.\(^{53}\) Fuel was only the most obvious problem. In 1920, inoperative transformers remained at Moscow substations because only two of fourteen repair cars worked and inspectors refused to go on foot because they lacked boots. A request for seventy screwdrivers produced one. Utilities needed wood for fuel but also to replace poles torn down for barricades during the 1917 fight for Moscow and later for fuel. Hunger became a

serious problem after mid-1919 when supplying peat to Elektropere­
dacha depended on feeding the workers. In November 1920, Moscow
stokers were too famished to work a full shift.54

The newly established extraordinary commissions for fuel supplies
in Moscow and Petrograd unified the utilities of the two cities into
networks early in 1919. Petrograd’s Petrotok had to embark on a proj­
et of technical unification before the city’s utilities could function co­
operatively.55 In contrast, the Moscow Unified State Electric Stations
(MOGES, Moskovskoe obedinenie gosudarstvennykh elektricheskikh
stantsii) was a true unified system whose stations operated on the
same current and frequency, allowing the transfer of electric power
for more efficient operations. The monopoly position of the 1886

54 TsGANKh f. 9508, op. 1, ed. kh. 12, 1–4; TsGANKh f. 3429, op. 1, ed. kh. 1162,
55 L. V. Sventorzhetskii, “Proekt obedinienia elektricheskikh tsentralnykh stantsii Pe­
trograda,” Tekhnicheskie izvestii, 1918, no. 3: 1–7.
### Table 5.1. Fuel use in Petrograd utilities, 1917–21

<table>
<thead>
<tr>
<th>Year</th>
<th>Wood⁹</th>
<th>Fuel oil⁹</th>
<th>Coal⁹</th>
<th>Local coal⁹</th>
<th>Peat⁹</th>
</tr>
</thead>
<tbody>
<tr>
<td>1917</td>
<td>1</td>
<td>151</td>
<td>146</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1918</td>
<td>14</td>
<td>91</td>
<td>65</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1919</td>
<td>567</td>
<td>31</td>
<td>22</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>1920</td>
<td>600</td>
<td>20</td>
<td>13</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>1921</td>
<td>302</td>
<td>65</td>
<td>5</td>
<td>9</td>
<td>200</td>
</tr>
</tbody>
</table>


⁹ Thousand cubic meters.

The company and its prewar attempt to capture the industrial market had produced a citywide cable grid, and Elektroperedacha provided some independence from southern oil. Without its peat station and unified grid, Moscow’s power supply would have suffocated.

One sign of desperation in 1918 was the concerted substitution of wood and peat for the coal and oil no longer available. Instead of local fuels supplying regional stations, wood and peat now fired existing central stations in last-ditch efforts to keep some electricity flowing. Five electric stations in Moscow and Petrograd converted to wood in 1918–19; in the second half of 1919, they received 750,000 cubic meters of wood, or 21 percent of the 3,570,000 cubic meters distributed to approximately 400 establishments.⁵⁶ Wood provided over half the fuel for Petrograd in 1919–20 until supplanted by oil and peat in 1921 (see Table 5.1). The new government also institutionalized peat as a state priority with the establishment of the Main Peat Committee (Glavnyi torfianoj komitet), a peat academy, survey and construction groups, and a congress of peat workers.⁵⁷ This institutionalization benefited primarily regional stations; given a choice, local stations preferred higher-quality fuels.

The now-standard problems of resource allocation and distribution

---


hindered fuel production everywhere. Consequently, the large wartime increases in production of the Central Industrial Region's local fuels, peat and brown coal, disappeared. Peat production fell by a third from 1913–16 to 1919. Production of brown coal doubled from 1913 to 1917 before sinking to one-third above prewar levels in 1919.

These shortages devastated the economy. By mid-1918, "the catastrophic state of fuel affairs in the Petrograd region threatens northern industry with an inevitable death." Despite the conversion of stations to wood and peat, Petrograd power generation decreased sharply from 289 to 89 MkWh from 1916 to 1919. Petrotok cut some users off completely and limited others to two or three hours of power daily in the worst months.

Successfully changing the Petrograd fuel supply demanded significant changes in preparation and burning. The wartime shift from British and German coal to Donets coal and fuel oil required only minor boiler alterations because the quality of fuel remained high. The civil war shift to local fuels—wood, peat, and Borovicho coal—demanded major changes in boilers. The enormous consumption of wood (fifty wagonloads a day for the six converted boilers of the 1886 Company station alone) also necessitated a new supply system to deliver the wood directly to the boilers.

Creating the most efficient boiler for wood required much experimentation. The initial, extremely unsuccessful tests of the Kirsh firebox were overshadowed by the development of an efficient woodburning boiler by professor Tikhon F. Makarev, a member of the Moscow heat committee. By enabling utilities to burn wood, the Makarev boiler kept the Moscow and Petrograd utilities operating

58 M. Nemenskii, "Doklad po obsledovaniyu i revizii del glavnogo torfianogo komiteta otdela topliva VSNKh," Narodnoe khoziaistvo, 1918, nos. 6–7: 367.
59 For peat, from 1,580 to 1,080 kilotons; for brown coal, from 324 to 810 and back to 480 kilotons; see M. Progorovskii, "Podmoskovskii kamennouglonyi basseini," Narodnoe khoziaistvo, 1918, no. 5: 10; see also "Dobycha torfa v tsentralno-promyshlennom raione v techenie 1913–1919 g. (v sezone)," Narodnoe khoziaistvo, 1920, nos. 5–6: 11.
60 "Toplivosnabzhenie i perspektivy petrogradskoi promyshlennosti," Narodnoe khoziaistvo, 1918, no. 5: 47.
during the civil war. A less heralded but equally ingenious technical response to crisis was the development of heaters used in lightbulb sockets: "The natural stirring of the population to defend itself from extinction created an unusual blossoming of 'kustar' production of all possible heating instruments" to the point that nearly every apartment in Moscow had one. These heaters kept the population alive and per capita consumption at prewar levels despite the loss of industry and population.

Unlike the Lodygin lamp, which was essentially created in isolation, the Makerev boiler grew from a specific, highly visible state need. Close ties among the Moscow heat committee, utilities, and government fused a defined need, the financial and technical means to solve it, and the scientific and industrial expertise to implement the solution. The kustar heater illustrated that a low-technology approach operating without the resources of government could also satisfy social needs. Both boiler and heater evolved in an environment where specific problems demanded immediate resolution and the technical resources and skilled people existed. These technical improvisations could not, however, overcome the economic inertia of a society in collapse.

During 1919-20, the Extraordinary Commission for Electricity Supply for Moscow desperately sought more fuel. Railroad problems limited oil supplies, and inadequate personnel, food, and extraction equipment caused peat shortages. These shortages forced the 1919 alteration of boilers to burn wood at every station except the factory stations near Elektroperedacha. The problem increasingly was not only insufficient fuel but inefficient utilization of that fuel. Utility efficiency dropped by half due to poor fuel (including green wood), poorly maintained equipment, boilers burning fuels for which they were not designed, and poor working conditions. As elsewhere, the lack of spare parts and maintenance proved major problems.

Output in 1919 dropped to less than 40 percent of the 1916 peak, as

---

66 TsGANKh f. 3429, op. 1, ed. kh. 1162, 38-40, 167, 195.
67 Ibid., 13-14.
68 "Moskovskoe kommunalnoe khoziaistvo vo vtoroi polovine 1921 g.," Kommunalnoe khoziaistvo, 1922, no. 10: 20.
Graph 5.2 shows. From 1919 to 1921, trams ceased operating and industrial use dropped sharply. Only Elektroperedacha and nearby factory stations, hastily connected to the peat plant’s 70-kV transmission lines, kept Moscow supplied with electricity. During the first months of 1919, Moscow utilities had only a few days’ supply of oil; operations literally hinged on a single trainload of oil and very strict user restrictions. The capital actually suffered a two-day blackout in December 1919 caused by a lack of oil that closed the 1886 Company station, bad weather, and administrative mismanagement that sent peat to the wood-burning tram station. So much peat piled up that no room existed for wood, closing the tram station. A freeze and snow-

---

69 A. Reidel, “Elektrosnabzhenie Moskvy i Moskovskoi gubernii,” Kommunalnyi rabotnik, 1921, nos. 3–4: 12; nos. 5–6: 12.

70 “Postanovlenie VSKNh ob upravlenii elektricheskikh stantsii Bogorodskogo raiona,” Sbornik dekretov, postanovlenii, raspriazhenii i prikazov po narodnomu khoziaistvu, 1921, no. 3: 119.

storm prevented access to the wood stockpile. Meanwhile, Elektrope-redacha ran short of peat.72

These shortages accelerated interest nationwide in unifying electric stations into grids. Three types of unification emerged. The first unified all the utilities of a city into a single network, like the MOGES. The second type linked city lines via substations to regional stations, as proposed by the VI Section in 1916. The third type, a product of war communism and the need for electricity, connected unused stations at closed factories to supply nearby factories and other users.73

All three types had Western antecedents, but extreme need and limited resources pushed factory-to-factory unification to the center of Soviet attention.74

Local Construction

While shortages crippled generating capacity and planners worked on large-scale electrification schemes, more than 250 small second- and third-tier stations were built (Table 5.2).75 This local growth was based significantly on stations started in tsarist times.76 Like other utilities, these stations, with average capacities of 90 kW for urban and 18 kW for rural stations, suffered from inadequate funding, equipment, supplies, and personnel, as seen in the declining station size over time. Like the VI Section in tsarist times, the newly created ETO and TsES gave technical assistance when requested.77 This growth occurred almost unnoticed by the electrical engineering establishment, which viewed these small stations as an unchallenging line of technological development. Although they lacked the theoretical justification, technological challenge, and actor network that made regional stations so attractive, the rural stations represented an alternative line.

---

72 Information from the holdings on Iu. V. Lomonosov in the Leeds Archive, courtesy of A. J. Heywood. See also TsGANKh f. 3429, op. 1, ed. kh. 1162, 195.

73 In early 1919, Elektrostroi planned this technically “very simple” task for several factories; “Iz doklada upravliaiushchego upravleniia elektrosooruzhenii A. V. Vintera predsedateliu Sovnarkoma V. I. Lenin,” 21 April 1919, Krashyi arkhiv, 1939, no. 96: 28.


75 Different sources present slightly different data. E. g., E. N. Moiseenko-Velikaia Gorev, “Proizvodstvo elektricheskoi energii,” Elektrifikatsia, 1923, no. 8: 6–16.


77 Gladkov, Voprosy, 298.
of technological development with quite different political implications. By the early 1920s, these stations had acquired theoretical justification and a political network of supporters who viewed them as a means to transfer electric light and power together with state power rapidly to the countryside.

A sense of the vast distances yet to be covered came in a January 1919 issue of *Ekonomitcheskaia Zhizn* (*Economic Life*), a VSNKh newspaper. An article described the advantages of electric over kerosene lighting, an argument that had appeared forty years earlier in *Elektrichestvo* with the arrival of incandescent lights in St. Petersburg. The audience had changed but the arguments remained remarkably constant over time. As electric light diffused into new areas, justifications and lures for users preceded it. The article also hailed local projects that represented the first application of electricity for the people in whose name the October revolution was carried out. Despite industrial needs, the first new areas electrified were workers' apartments and nearby streets to demonstrate the benefits of the new government. Such new construction and interconnections indicated a new priority—serving the unserved. These projects represented a step toward the democratization of electric energy, albeit under very different circumstances than its prewar advocates had anticipated.


Electrical Engineers and Planning

The early years of Communist rule expanded the coverage and goals of the wartime discussions about planning and electrification. Two accompanying trends were the further growth and acceptance of a technocratic, rationalist approach to postwar, now post-civil war, reconstruction, and the transfer of the electrical engineering leadership from Petrograd to Moscow.

By October 1917, key elites in government, industry, and the engineering communities had experienced some state planning and control and expected more. The mix of Marxist utopian visions and revolutionary dreams further strengthened interest in planning, as did new journals such as *Ekonomika, Trud, i Tekhnika* (Economics, Labor, and Technology), published by the Moscow Soviet.

Knowledge of foreign activities and ideas, particularly German wartime state planning, stoked this growing Russian interest. A major German influence was Karl Ballod, an economics professor in Berlin. His *Der Zukunftstaat* (The Future State) described how to organize a centrally planned socialist economy. The 1898 German edition appeared in several Russian translations from 1903 to 1906. The second edition, published in Germany in 1919 and in Russia in 1920, helped convince Lenin and others of the feasibility of a planned economy. Ballod’s ideas influenced Russians as early as 1898, when Aleksandr I. Ugrimov, later a Soviet specialist on agricultural electrification, heard Ballod lecture at Leipzig. While Ballod influenced Russian concepts of planning, another German, Georg Klingenberg, influenced Russian concepts of regional stations. German experience and theory were

---

81 Stites, *Revolutionary Dreams*, 36–37, 45.
85 G. M. Krzhizhanovskii, “Tekushchie voprosy elektrifikatsii,” *Elektrichestvo*, 1922, no. 2: 4; see also L. Dreier, *Zadachi i razvitie elektrotekhnhiki* (Moscow: Pechatnoe delo,
important because they gave Russians, Bolshevik and non-Bolshevik alike, the justifying legitimacy of foreign interest as well as guidelines.

A elite group of electrical engineers in Moscow and Petrograd promoted an agenda, based on Western concepts and activities, to develop regional stations and industries based on technically and economically rational criteria that they defined. These electrical engineers were not apolitical, but their politics was the politics of expertism, where they—as the most qualified people—would make the key decisions. The activities of these men fit William M. Evan’s definition of technocrats: “The engineer imbued with the technocratic vision believes, on the one hand, in the capacity of technology to solve all social problems without recourse to value considerations, and, on the other hand, in the importance of integrating engineers into the political structure of society.” Underlying the faith in planning were two important technocratic concepts: the most rational geographic distribution of industry proximate to resources and transportation, and the careful, concomitant creation of detailed information with which to allocate resources. The best example of the technocratic approach was Vasilii I. Grinevetskii’s extremely influential Poslevoennyie perspektivy russkoi promyshlennosti (Postwar Perspectives on Russian Industry), published in Kharkov in 1919 and reprinted in Moscow in 1922. A Russian pioneer in planning methodology that integrated engineering and economic criteria, Grinevetskii wrote the most comprehensive analysis of nation-wide economic reconstruction. An elaboration of his wartime analysis of engineers’ responsibilities, Poslevoennyie perspektivy reached a larger audience because of the much greater desire for radical reconstruction and the depth and breadth of his information and proposal. Grinevetskii described the country’s primary task as, in descending priority, rebuilding supplies of fuel and raw materials; reconstructing and developing transportation; restructuring the technical organization of industry; improving the quality and efficiency of labor; defending the domestic market from foreign imports;

1919), 22, and Boris Kushner, Revoliutsiia i elektrifikatsiia (Petrograd: Gosudarstvenoe izdatelstvo, 1920), 13.


87 K. A. Krug, Elektrifikatsiia Tsentralno-promyshlennogo raiona (Moscow: Teplovoi Komitet, 1918), 3-4.

and changing the market's economic structure. To secure fuel and raw materials, he wrote, "in first place should be the electrification of industry supplied from regional stations, working on local poor-quality, but therefore cheap, fuel." The now-standard troika of peat, Moscow brown coal, and hydropower would power these stations. Unlike other proposals, Grinevetskii's did not neglect financing. Despite the danger of economic and political enslavement, he saw an enormous flow of foreign capital—15–20 billion gold rubles over ten to twelve years—as a "vital condition for the economic revival of Russia and reconstruction of its industry."

Despite political differences, Soviet planners in the 1920s used Grinevetskii's wide-ranging concepts, data, and methodology for three reasons. First, his mesh of engineering and economic rationalism fit well into the technocratic Soviet concept of planning. Second, students and colleagues of Grinevetskii worked for GOELRO and Gosplan, which provided a direct conduit for the transfer of his work. Third, his information was unsurpassed. In 1919–20, members of the heat committee, TsES, the VI Section, and other technocratically oriented engineers, economists, and planners needed reliable information. They realized, in Grinevetskii's words, that planning must be based on "real data on the economy of the whole country," because "future possibilities are made feasible and tightly limited by the past and present." Knowledge, if not power, at least constituted the building block for planning and action. Starting with the publication of utility statistics in 1910 by the VI Section and continuing through the Glavelektro geological expeditions of the 1920s, gathering data was a major function of every electrification and planning agency.

A major contribution to this effort was Karl A. Krug's *Elektrifikatsiia Tsentralno-promyshlennogo raiona* (Electrification of the Central Industrial Region), published in 1918 by the heat committee. Krug, spurred by a fuel crisis that he viewed as chronic and not temporary, outlined a plan of electrification noteworthy not only for its assumptions about the potential of inexpensive electricity but also for the rich array of

90 Ibid., 46–47.
information. Krug examined in detail the level, type, and distribution of electrified and mechanized industry in the Central Industrial Region and the capacity needed to electrify it.94 The works of Grinevetskii, Krug, and other members of the heat committee formed the earliest database about electrification and the economy, information that proved invaluable to the GOELRO plan of 1920.

Krug, a founding member of TsES, claimed that the rationale for regional stations was unequivocally rational, economic, and technical, not political.95 Engineering professor Lev V. Dreier, another colleague of Grinevetskii from student days at the Moscow Higher Technical School, also argued that achieving maximum economic efficiency—again, determined by the engineer—dictated electrification by state-controlled regional stations built with standardized equipment.96 The promoters of a regional station in White-controlled Rostov-on-Don advocated a similar efficiency-oriented approach to put Russian industry and society on a new footing.97

In the creation of political support for electrification, the most important group were the rare hybrid Bolshevik electrical engineers, who worked in Moscow and served as the link between the Communist party and electrification. These men spoke with a technical authority party nonengineers could not match, and they had much better ties with the new leadership than the Petrograd engineers ever had with the tsarist or provisional governments. Lenin’s acquaintance with several electrical engineers and technicians stretched back two decades. Krzhizhanovskii and Vasilii V. Starkov shared Siberian exile with him; Krasin knew Krupskaia, Lenin’s wife, before Lenin did and could have assumed the leadership of the Social Democrat party in 1907; Klasson and Radchenko met Lenin in 1895.98 Krzhizhanovskii in particular enjoyed a close relationship with Lenin. These Bolsheviks were only a few of the electrical engineers who promoted wide-scale electrification and staffed the new government offices. Of the approximately 250 people who worked on the GOELRO plan in 1920, only

---

94 Krug, Elektrifikatsiya Tsentralno-promyshlennogo raiona, 4–37, 40–54.
95 Ibid., 43–44, 50–51.
eight were Bolsheviks. What distinguished Bolshevik electrical engineers was their high status in both the Communist party and engineering communities.

According to Thomas Remington’s study of socialism and technology, state technologies attracted five types of Communists during this period: inactive Bolsheviks with engineering and management skills (Krzhizhanovskii, Krasin), active Bolsheviks strongly committed to technical progress (Lenin, Aleksei I. Rykov, the VSNKh chairman), Mensheviks who joined the Bolsheviks (Iu. Larin, war communism’s “magician of economics”100), Mensheviks who did not join (statistician Vladimir G. Groman, who had an “obsession with central planning” and worked for the Main Fuel Committee and Gosplan101), and leftist Communists who were fervent technological rationalists (Bolshevik journalist Boris Kushner).102 Remington also includes scholars interested in central planning though hostile to the new state (Grinevetskii), but he neglects other non-Communist professionals and political activists interested in harnessing technology for economic, political, and social goals. These activists, such as Osadchii and P. I. Palchinskii, an engineer entrepreneur who formed a prewar coal syndicate and served as deputy minister of trade and industry under the provisional government, shared a common interest in a centralized, directed economy, whether from the viewpoint of the engineer’s technocratic rationalism, the Menshevik’s “technocratic soul,” or the Bolshevik’s “democratic centralism.”103 At the heart of these interests lay the technology-based goals of the modernization, rationalization, and transformation of Russian society. Bolsheviks constituted a small minority of these technological enthusiasts; ideas of planning and societal transformation by technology were not a Communist monopoly but widely disseminated and shared among engineering and political elites.

Both sides in the civil war had advocates of electrification, but the overwhelming majority remained with the government holding Moscow and Petrograd. If a White government had controlled the two

cities and Red forces waged a civil war, most electrical engineers would have worked under the Whites. Indeed, only the apologia for halting construction of a regional station in White-held Rostov-on-Don distinguished it from stations under Communist control:

Political events [flow] one after another, like waves, but the Bolshevik wave, accompanied by destruction and plunder, threatens to brake if not stop this project of importance to the state. Only after this numbness passes will the pulse of social-legal peace return for private initiative, will the [company] turn its energy to the project which will play such a large role in the construction of a United Great Russia.\textsuperscript{104}

Electrification had a growing base of support in the government. The numerous wartime commissions and other bodies established to regulate fuel and power played an important role in institutionalizing electrical engineers into the leadership circles of the country. This infusion of electrical engineers into government positions did not take firm root until the February revolution but expanded rapidly after the October revolution. The "Moscow mafia" based at the 1886 Company created and filled new state positions, while the heat committee provided important theoretical and factual underpinnings for electrification planning and contributed to immediate utility survival.

Until surpassed in the 1920s by Gosplan, the heat committee dominated regional electrification planning.\textsuperscript{105} Its members wrote on electrification, developed the city-saving Makarev boiler, and worked in government bureaus.\textsuperscript{106} The committee’s most prominent members, Kirsh, Grinevetskii, Krug, and Leonid K. Ramzin, never equaled the 1886 Company’s "Moscow mafia" in importance for reasons of politics, death, and institutional weakness. The committee’s members tended to the more moderate Menshevik and Cadet political factions, which restricted any possibility of leadership under Bolshevik rule. The deaths of Kirsh and Grinevetskii in the 1919 typhus epidemic eliminated two leaders.\textsuperscript{107} Finally, these men worked in an academic environment and did not participate directly in utility and govern-

\textsuperscript{104} Raionnaia elektricheskaia stantsiia Donetskogo basseina, 17.
\textsuperscript{105} Glazunov and Sirotinskii, "Uchastie Moskovskogo energeticheskogo instituta," 13.
\textsuperscript{107} Bailes, Technology and Society, 53.
ment operations. Ultimately, these professors could advise but not lead.

The transfer of the capital to Moscow in 1918 and the ascendence of the practicing over the university engineer reduced the importance of the Petrograd electrotechnical leadership. Osadchii is an excellent example of the transfer of leadership. Before October 1917, he headed the VI Section, the new Union of Electrotechnicians, and the SED. After October, he worked for the Petrograd branches of the TsES and later GOELRO. In 1921, he moved to Moscow to work for Gosplan, the state planning agency, and the science and technical section of the VSNKh. The shift to Moscow of the electrical engineering leadership symbolized its eagerness to establish closer ties with the new government and the state’s recognition of the necessity of electric power for industrial society. Neither electrical engineers nor government could prosper without the other. In contrast, the Academy of Sciences resisted Bolshevik rule and did not move physically to Moscow until 1934 as part of a state centralization of the management of science following a reorganization that reduced the academy’s independence.108

One striking aspect of Soviet rule was the multiple posts held by engineer-managers, a reflection of the hodgepodge of new organizations, shortages of skilled people, and the extraordinary outburst of technocratic enthusiasm. Krzhizhanovskii, the premier example, in 1919 had executive responsibilities in the KGS, Elektroperedacha, the ETO, the Extraordinary Commission for Electricity Supply in Moscow, the operating board of the Bogorod electric stations, and the board of the state wire and cables factories as well as serving as a delegate to the Moscow Soviet. Krasin and Boris Kushner, a Bolshevik journalist, formed two-thirds of both the ETO governing board and the Extraordinary Commission for Managing the Unified Electrotechnical Industry.109 Krasin also was a TsES member, served on the VSNKh presidium, chaired the Special Commission to Supply the Red Army, and worked on foreign trade. Occupying multiple posts instead of eliminating overlapping responsibilities allowed stricter centralized control of the growing energy agencies, but it ensured the continuance of a dense bureaucratic thicket.

From the beginning, planning concentrated on the larger concerns

---

109 TsGANKh f. 3429, op. 1, ed. kh., 1162, 135–37, 159; V. Iu. Steklov, Gleb Mak-similianovich Krzhizhanovskii: Zhizn i deiatelnost (Moscow: Nauka, 1974), 280; Venediktov, Natshionalizatsiia promyshlennosti i organizatsiia, 309.
of wide-scale electrification. At the first session of the TsES in October 1918, chairman Krasin set four immediate tasks: establish nationwide norms for transmission voltages and frequencies, a sine qua non for large-scale networks and for standardized equipment; elucidate the number, power, and distribution of regional stations required to ease the fuel shortage and harness undeveloped natural resources; ascertain the availability of supplies for central stations; and create a general plan for the electrification of Russia.¹¹⁰ Krasin’s first three tasks were specific, but the fourth was an all-encompassing amalgam of other goals—electrifying railroads and industrial regions, establishing and expanding electrotechnical industries, setting standards and examinations, and supplying the needed specialists—into the overall goal of national electrification.¹¹¹

The status of electrification increased significantly from 1917 to 1920. The first congress of regional planning bureaus in May 1918 did not mention electrification. Seven months later, the second congress stated that electrification “can give concrete results only after much time but will instantly place industry on new rails [and] could change the entire nature of our industry.”¹¹² The favorable perception of electrification paralleled the creation of agencies advocating electrification. In May 1918, Elektrostroi, the TsES, and its regional bureaus did not exist; in December, they did.

In a major mid-1919 article, Konstantin Ia. Zagorskii, a railroad economist with an interest in municipalization, called plans for regional stations premature but necessary.¹¹³ Zagorskii wrote to sober planning enthusiasts and temper their utopian declarations. Only rational projects with a possibility of success deserved serious consideration. Although the foremost priority remained transportation, electrification promised, “like railroads, to serve as an initial point for wide transformations in very different parts of our social, economic and political life. . . . It is impossible not to conclude that this category of state construction must attract special attention and care from the KGS. . . . It is urgent as quickly as possible to work out a system for the wide and planned physical electrification [elektrofitsirovanie] of all regions and areas of the country.”¹¹⁴

¹¹¹ “Raspredelenie voprosov mezhdu chlenami soveta,” in ibid., 47–49.
Zagorskii outlined the most detailed rationale for electrification yet to appear in the VSNKh journal *Narodnoe khoziaistvo* (National Economy). His broad perspective included the electrification of major industrial regions but also of the countryside, where the vast majority of the population lived. Zagorskii had taken a large step beyond the cities to the full electrification of the country. Regional stations hitherto were viewed mainly as supplying power to cities. Now he redefined the region to benefit the thousands of villages. This line of thought would become more important as the Communist party placed increasing importance on strengthening its rural ties.

Electrifiers did not hold a monopoly on technocratic proposals for economic reconstruction. But electrification differed from railroads and other technologies of the first industrial revolution in its promise of a new tomorrow. In revolutionary times, the visionary initiative went to the technology promising transformation, not simply reconstruction.

Regional Stations

In contrast with the gloomy state of utility operations, the future of regional stations appeared increasingly bright. By 1920, Lenin's political support had allowed construction to begin on four Soviet regional stations around Moscow and Petrograd. The ideas and siting for these stations were not new; the high-level support was. In 1917–19, Lenin discussed the dismal electrical supply of Petrograd and Moscow with Communist and non-Communist electrical engineers. Together with the work of Elektrostroii, the ETO, and the TsES, these conversations spawned the hydroelectric dams of the Volkhov and Svir rivers for Petrograd and the brown coal Kashira plant and peat-fired Shatura station for Moscow. Although the initial results were minor, the quick Soviet action markedly contrasted with the inaction of the old regime.

Petrograd officials, faced with the most desperate energy situation, had responded quickly to the new government. Before Elektrostroii existed, the Northern Region planning bureau formed an electrification committee, which in March 1918 agreed with the bureau's

---

115 Besides Krzhizhanovskii, Lenin met with Aleksandr V. Vinter, the future head of Elektrostroii; Genrikh O. Grafitio, a long-time hydropower advocate; Piotr G. Smidovich; Ivan I. Radchenko, a peat specialist; and Ivan V. Egiazorov, part of a group studying the Svir. See *SRE*, 24, 29–30, 32, 154; see also Lev B. Kamenov, ed., *Leninskii sbornik* (Moscow: Partiinoe izdatelstvo, 1937), vol. 21, 226–27.
committee on economic policy to construct Volkhov and Svir hydrostations. Elektrostroi quickly assumed the responsibility for both hydroelectric projects and predicted their completion by 1922–23. At Lenin’s urging, Genrikh O. Graftio, who had formulated tsarist hydropower proposals, headed the electrical engineering section of the Volkhov project.


118 Steklov, Lenin i elektrifikatsiia, 16; Genrikh O. Graftio, “Vstrechi,” SRE, 30. The model of a bourgeois specialist, Graftio shocked one Communist who met him in 1918.
Elektrostroi also controlled the 12-MW Kashira and 5-MW Shatura projects. These stations were salvage operations that relied on existing unused equipment and new imported equipment. The Shatura station was an engineering prototype to determine the feasibility of naval boilers for stationary powerplants. If it was successful, Elektrostroi intended to build a 40-MW station. The turbine for the Shatura station came from the Russo-Baltic factory, and its boilers came from the Provodnik factory. The uncertainty accompanying Kashira was such that the initial designs called for use of Donets coal and Baku oil as well as local brown coal.Blueprints for the turbines and boilers accommodated a wide range of the possible available equipment. The technical challenge was the development of a boiler to burn brown coal efficiently. Because of its closer proximity to Moscow, a nearby river and railroad, and prior construction, Kashira received a higher priority than Shatura, with initial operations optimistically predicted by 1920.

Russian electrical engineers broke new ground with these stations. The construction of the Volkhov and Svir stations, the first large-scale Russian hydrostations, demanded mastery of new concepts and technologies. All four stations used long-distance, high-voltage (115 kV) transmission lines, another area of limited experience. These technical challenges, combined with financial, material, and personnel shortages, ensured that Elektrostroi's optimistic schedules would not be met.

These stations' most novel aspect was not the technical challenges—Western countries had met them—but the political support for regional stations and the underlying concepts of wide-scale electrification and economic transformation. A 1920 Narodnoe khoziaistvo article on industrialization called "measures of a technical character to change the very structure and conditions of production" a priority behind only transportation. As in 1918, localizing production and consumption took precedence, but now new materials, fuels, and technical processes were perceived as ways to develop local substa-

---

by his formal manner, formal clothing, and reference to "Mr. (grazhdanin) Lenin; see N. P. Bogdanov, “Skvoz grozy i buri," ibid., 43.
119 "Organizatsiia proektirovaniia i stroitelstva elektrostantsii," 29 June 1918, in Gladkov, ed., K istorii plana, 41–42.
122 N. Chamovskii, "Znachenie raionirovaniia promyshlennosti," 17.
tutes. The needs were the same but a new rubric was used, that of new technologies to achieve wider economic and social goals. And electrification was the new technology par excellence.

The October revolution occurred at a paradoxical point in the development of Russian electrification. At the start of 1920, the present never appeared so appalling, nor had the future ever looked so bright. The problem was the transition from the dismal present to a radiant future. The utilities were in far worse condition than in 1917: the Petrograd utilities, once the pride of Russia, burned wood and produced only a third of their 1916 output. Stations elsewhere suffered from equally serious shortages and the decay of the infrastructure.

The war had demonstrated the link between electric power and industrialization. Now the importance of electricity expanded to encompass the transformation of industry and society. A network of political, economic, and engineering actors began coalescing as the vision of electrification diffused and electrical engineers established footholds in executive and planning sections of the new government. The attraction of an electrically transformed future spread from the electrical engineers to other economic and political elites and attracted mass publicity as part of a larger wave of technological and revolutionary utopianism. New forward-looking organizations of electrical engineers, of utilities, and, most important, in the government established an organizational framework for electrification even as the boundaries between utilities and the state collapsed.

The interest in electrification grew not only from its intrinsic attractions but also from the devastation of the existing technical infrastructure, especially the railroads. Regional electrification by locally fueled stations fit the autarkic economic and political conditions of revolutionary Russia. The growing political and engineering desire to use technology to transform society also increased the attraction of electrification, which had gained a political focus: it became the connecting point between planning for rational economic development and large-scale remolding of the social and industrial landscape.