In the autumn of 1898, the popular English journalist William T. Stead undertook a journey around Europe to find out whether the upcoming Peace Conference in The Hague stood any chance of success. He visited London, Brussels, Berlin, Moscow, Yalta, Constantinople, Sofia, Budapest, Vienna, Rome and Bern in rapid succession. He travelled the Orient Express of the international railway company Wagon-Lit, and proudly testified as to the ease, speed and comfort of travelling. In his articles, he expressed the view that the European nation-states were ready to unite in a Union comparable to the United States of America in order to escape the ‘blighting curse of the armed peace’, and prevent war. He was full of hope, because the countries he passed through were not at war and permission to cross borders was obtained with ease. He noted with great satisfaction that ‘for travelling purposes Europe is already a commonwealth’. Stead appealed to an oft-invoked conception. In the second half of the nineteenth century, many intellectuals before him had argued that trade between countries, facilitated by transport and communication networks, not only promoted economic growth but also made those countries unlikely to go to war. One of the best known expressions of this set of ideas was Norman Angell’s book *The Great Illusion*, published in 1909.

---

1 This article is a result of many interactions. We have the good fortune to work in a growing community of scholars working on transnational infrastructure development. For more information, we refer to www.tensionsofeurope.eu; For comments we are grateful to Kiran Patel, two anonymous referees and to our colleagues Alexander Badenoch, Suzanne Lommers, Frank Schipper, Geert Verbong, Erik van der Vleuten and Irene Anastasiadou who work with us in the research programme Transnational Infrastructures and the Rise of Contemporary Europe (www.tie-project.nl). We thank Alexander Badenoch also for his editing suggestions, and Martin Kohlrausch for his invitation and encouragement to publish in this special issue. We gratefully acknowledge the support of the Netherlands Organization for Scientific Research for our research. The first author is indebted to the European University Institute of Florence, which proved to be an excellent environment to work on this article.


3 Ibid., 9 and 12.

which had several editions in Britain and innumerable translations and editions abroad.⁵ According to Angell the logic of economic progress and the interests of the people in Europe made war illusory.

When the Great War erupted, the alleged networks of peace turned into instruments of war. The discourse of the peace-creating and integrative effect of networks did not wane, however. It continued to thrive on the foundations laid during the nineteenth century. In this article, we argue that this particular discourse is one of the pivotal elements of what we call technocratic internationalism. While we describe technocratic internationalism in general terms in the following section, the main body of our article analyses and compares the development of two infrastructures: motorway and electricity networks. These were two of the major new international networks whose development started in the interwar period. They allow us to demonstrate not only technocratic internationalism at work, but also the particular European direction it took in these years. Technocratic internationalist arguments were integrated into an agenda for European unification, one already alluded to by Stead.

1. Technocratic Internationalism and European Unification

Technocratic ideas were far more influential in the interwar years than is often realised. Elements of this thinking permeated and permutated fascist, socialist, communist and liberal ideologies. Technocracy should not be seen as a partial solution for optimising production. Rather, as Charles Maier has forcefully argued, business leaders, engineers, politicians, intellectuals, and their respective organisations and parties saw it as a way to create a new societal order for nation-states in Europe (and in North America) plagued by huge problems of instability, social conflict, unemployment and economic depression.⁶ Yet technocracy as such has seen only limited historical study, particularly in its international dimensions.⁷ We do not aim at a historical account here. Instead we introduce three core elements as a stepping stone for an analysis of technocratic internationalism in action. These


elements of technological internationalism are: the myth of networks, an assumed harmony between nation-states and a preference for a working method which separates technical issues from politics.  

At the heart of technocratic internationalism was a concern for creating prosperity and peace through the establishment of an optimised international economy. While economic integration should precede any form of political integration, economic integration itself was a function of technology since it could only emerge when transport, communication and energy networks were in place. The networks created economic dependencies, rationalised trade and production, and thus led to economic growth which subsequently united people; not only because of growing mutual understanding, but also due to the assumption that war would ruin their welfare. Connecting countries with motorways and power lines was seen as a better guaranty of peace than treaties in paper. We call the idea that networks automatically lead to peace and integration the myth of networks. During the interwar years, this myth was not only connected to infrastructures but also to international production cartels. Although technocratic internationalism stressed the importance of freeing the international economy from political constraints, it was not a plea for a liberal world of free competition. On the contrary, it was a demand for organised and planned capitalism, for avoiding wasteful competition between various networks and for internationally planned modernisation.

The second element of technocratic internationalism is the denial of the dichotomy between national and international interests. While many engineers were ardent nationalists, they nevertheless regarded it inefficient and artificial to allow political boundaries to determine the shape of networks. In their thinking, the optimal size of a network could be deduced from its function and technical characteristics. Engineers were often loyal to nation-states they represented, but also stood by their technocratic ideas of efficiency and coordination.

Finally, supporters of technocratic internationalism preferred a working method for international cooperation which separated the technical from the political. Supposedly ideologically neutral and scientifically trained engineers could bring their rationalisation and planning methods to social problems in a manner that mere politicians were incapable of doing. A common separation strategy

8 We derived these three elements from a combination of two sources: the technocracy literature and our empirical research into the work and ideologies of international engineering organisations.
9 To left-wing French economist Francis Delaisi, economic interdependence between nations was based upon "a new kind of machinery: steamer and railway lines, telegraphic cables [...]. It was an unalterable law for them not to perish, "On it depends the life of every nation." See his Political Myths and Economic Realities (London, 1925), 100–101.
10 That latter point was claimed by contemporary H. Sörgel, who saw power lines between countries stronger than any political treaty. See his Atlantropa (München, 1932), 118–119.
was to «technify» the discussion; in other words, to define certain issues as technical and non-political. These could then be discussed among engineers and other experts in order to determine the optimal solution. For the implementation, one should rely on internationally agreed recommendations to be implemented nationally on a voluntary basis.  

Technocratic internationalism was never embodied in a separate movement or ideology, nor was the term promoted by certain organisations or people. We see it as a very influential background ideology. It combined what Pemberton called two cults of the interwar period: technocracy and internationalism. We introduce it as an analytical concept which brings together a set of assumptions and summarises a dominant way of looking at social reality advanced by many engineers, business managers, civil servants of international organisations and intellectuals in the context of international meetings organised by organisations such as the League of Nations (LoN) or the International Labour Organisation (ILO) and many others, often dedicated to specific infrastructures and industries.

The interwar years were susceptible to technocratic thinking. The search for stability and the need to combat the Depression elevated technocratic thinking to a new relevance at both the national and international level. It surfaced not only in the workings of a host of international organisations but also in a number of plans for European transport, communication and energy networks. These networks were promoted as a means to overcome economic nationalism and political disagreement and to restore the pre-war prestige of European «civilisation». They were perceived as the cement of a new Europe. Technocratic thinking does not attribute any intrinsic importance to Europe. On the contrary, networks are often assumed to develop beyond Europe. Yet in this period technocratic internationalism became more deeply connected to an Europe agenda.

The relation between networks and Europe was strengthened by the work of the LoN and the ILO.

---

12 For a contemporary account on the subject, see P. B. Potter, «Note on the Distinction between Political and Technical Questions», Political Science Quarterly 50 (1935) 2, 264–271.

13 We are indebted to Dirk van Laak for the notion of background ideology. It was suggested in a personal conversation with one of the authors (JS).


15 They formed what is called in the international relations literature epistemic communities. These are networks of professionals with recognised expertise and competence who share a set of beliefs and projects which provides a rationale for joint action. See P. M. Haas, «Introduction: Epistemic Communities and International Policy Coordination», International Organization 46 (1992), 1–35.


Although both organisations were global ones, they had a strong bias towards European issues.\textsuperscript{18} They were dominated by European powers and stymied by European issues.\textsuperscript{19} Particularly after 1929, the constructed relationships between Europe and networks reached a new level when the LoN Commission for Enquiry on European Union (CEEU) was used by the passionate ILO director and staunch Europeanist Albert Thomas to advocate the building of a wide range of European public works in the early 1930s.

Since technocratic internationalism was never translated in one specific international movement that can be studied, one way to research its articulation and appropriation is to study the planning of concrete projects and the discussions they provoked. It is to this study we now turn.

2. Motorways for Europe\textsuperscript{20}

The Puricelli 1927 Plan

In October 1927, Piero Puricelli, an Italian engineer and owner of a construction company, published a map indicating how a network of motorways in Europe might evolve in the near future (see figure 1).\textsuperscript{21} The 1927 map showed both realised and projected motorways in Italy and in the rest of Europe.\textsuperscript{22} Puricelli knew about these plans because they circulated in an international network of engineers, tourist and automobile clubs, construction companies, and local and regional city administrators. They met regularly at conferences organised by the Permanent International Association of Road Congresses (PIARC).\textsuperscript{23} Puricelli enjoyed enormous prestige as he had built the world’s first motorway between Milan and Varese, opened in 1924.\textsuperscript{24} His pioneering concept attracted numerous supplied sources and inspiration. See F. Schipper, \textit{Driving Europe. Building Europe on Roads in the Twentieth Century}, PhD thesis Eindhoven University of Technology (Forthcoming, Amsterdam, 2008), chapter 3. Also see his contribution in E. Van der Vleuten et al., «Europe’s System Builders: The Contested Shaping of Transnational Road, Electricity and Rail Networks», \textit{Contemporary European History} 16 (2007), 321–348.


\textsuperscript{19} S. Marks spoke of the so-called Locarno tea parties, composed of Great Britain, Germany, France and Italy. See her \textit{The Illusion of Peace: International Relations in Europe, 1918–1933} (London, 1976). A similar argument is made recently in Z. Steiner, \textit{The Lights that Failed: European International History 1910–1933} (Oxford, 2005).

\textsuperscript{20} Special thanks go to Frank Schipper, whose work

\textsuperscript{21} P. Puricelli, \textit{L’Autostrada Bergamo-Milano} (Bergamo, 1927).

\textsuperscript{22} For an overview see K. Kaftan, \textit{Der Kampf um die Autobahnen. Geschichte und Entwicklung des Autobahngedankens in Deutschland von 1907–1933 unter Berücksichtigung ähnlichen Pläne und Bestrebungen im übrigen Europa} (Berlin, 1955).

\textsuperscript{23} For PIARC history see G. Mom, «Building an Infrastructure for the Automobile System: PIARC and Road Safety (1908–1938)», in \textit{Proceedings Historical Symposium - Road Civilisations of the XXth Century, XXIII\textsuperscript{rd} PIARC World Road Congress}.

\textsuperscript{24} On Italian developments see L. Bartolotti, «Les
interested visitors. In 1925, Willy Hof, director of a German trade society, and Robert Otzen, professor at the Technical University of Hannover, traveled to Italy to see the motorway. Back in Germany they founded the Verein zur Vorbereitung der Autostraße Hansestädte-Frankfurt-Basel (Hafraba, 1926). This association mobilised a network of people from various cities responsible for traffic development, including mayors, leading officials and engineers of transport administrations, and a range of directors from construction companies and chambers of commerce. It focused its activities on building an international road from Hamburg to Basel, ending at the port of Genoa.\textsuperscript{25} Although the association primarily pushed for an international road, it also envisioned a national German network which included a second international connection. This artery began at the coastal city of Stettin, went to Berlin, Munich and from there to Italy, with a feeder line from Vienna.

Figure 1: The Puricelli 1927 plan

Both arteries were included in the 1927 plan (see figure 1). These connections were the result of ongoing interactions after the 1925 visit between the Hafraba association and Puricelli. The latter became a member of the Hafraba executive board.26

The other important node in the human network of experts was Gustav Wenk, a representative from the Swiss government. For the realisation of the Hafraba-Puricelli motorway, Swiss participation was necessary. To discuss the Swiss connection, Wenk, Puricelli and the Hafraba leaders met in the Spring of 1927 in Zurich for an international conference that initiated the creation of an association, the Vereinigung zur Förderung des Baues einer Autostraße Basel-Italienische Grenze. The discussions led to two lines connecting Italy to Germany through Switzerland, both of which were in the 1927 map. Plans for motorways in France, England, Belgium and Spain were also under development from 1927 onwards. These too were included in Puricelli’s 1927 map.27 In that year the future for the motorway seemed promising and bright. In Italy an extensive motorway construction programme was well underway with private and public support – both local and national. At the same time, in Germany and France, plans were put on paper to connect the two nations. Above all, an international network of people was in place to coordinate the activities. The 1927 Puricelli map must be interpreted as a reflection of these activities as well as a conscious attempt to further stimulate and direct them.

On the national level, the following years were less satisfactory than the members of the network had anticipated in 1927. Still, some progress was made. In France a more extensive motorway network plan was developed by the engineer Edmond Pigelet, supported by French industrialist Lucien Lainé, who created in 1929 a company with the aim to realise this plan. The Pigelet-Lainé plan included connections with Belgium, the Netherlands and Spain not yet planned in 1927. Lainé expected the line to be the beginning of «the necessary construction of a French and European network».28 But despite all planning and lobbying efforts, no motorway had been built by 1931. Even worse, the motorway construction programme was heavily criticised in Italian media. Opponents argued that the costly motorways were hardly used, while improvements to regular roads were lacking. Similar criticism was voiced in other countries and at international PIARC meetings. Many road engineers saw the building of automobile-only motorways as an unnecessarily expensive solution only serving the rich and precluding other investments. Besides, they did not foresee any role for automobiles in long distance international travel, which would best be served by railways and perhaps aviation.29

---

26 Ibid., 30.
27 These various Europe plans are discussed in various publications. To get a full picture, one needs to combine Kaftan, Der Kampf; Varenkamp, «The Hafraba»; Bartolotti, «Les Premières», and Strohkark, Die Wahrnehmung. See also her note 406.
28 Cited in Ibid., 104.
29 In the 1920s, it was also not clear what kind of road a motorway was. According to Mom, road nomenclature often reflects the «localized tradition» of international road building. We used «motorways», a term employed in the United Kingdom.
Almost all elements of technocratic internationalism are visible in this first episode of the motorway story. The idea for motorways was developed within a network of experts who coordinated their activities internationally on a voluntary basis. Their action plan was to lobby with national governments for the construction of national motorways which would fit their international plans. Coordination between various nationally-built roads would be achieved through international networking. Despite the emphasis on the international character of motorways, a national motorway network which fitted the international plans was also envisaged. The planners thus did not see a strong opposition between national and international network-building. The main discussion among road engineers was whether there was a need for motorways at all. Some argued that priority should be given to the improvement of existing roads instead of building complete new roads. Finally, the promoters of the motorway also drew on the myth of networks, primarily on its importance for economic integration. They emphasised the promise of attracting international commerce and tourists.

The idea that motorway networks were a uniting force in Europe was not strongly developed. This would change due to an alignment with the ILO led by Albert Thomas, who was not only a promoter of European unification but also deeply influenced by the discourse of technocratic internationalism. He wrote,

«It is already more than a century ago that the genius of Saint-Simon [one of the founding fathers of technocratic thinking, the authors] developed his idea of a European federation and proposed an immense program of public works; didn’t he say that the importance of such works was to «transport all the nations beyond themselves», so to say, to free them of all prejudice, of all routines, of all traditional political sentimentalities that might prevent them from uniting.»

Building Motorways to Combat Unemployment
While prospects on the national level did not look bright in 1931, motorway plans gained new impetus through an international initiative of the ILO, directed by Albert Thomas. The economic crisis and subsequent unemployment problems prompted Thomas to design a programme for «extensive public works in Europe» presented to the governing body of the ILO on 18 April 1931. He thought of railways, electricity transmission networks, waterways and an international road system. Thomas submitted his programme to the CEEU. The CEEU was created in answer to the famous address of Aristide Briand to the Assembly of the LoN in
September 1929, who pleaded for a sort of federal bond between the people of Europe. Thomas had welcomed Briand’s initiative for European unification, but he also disapproved of putting the political dimension upfront. Following his technocratic inclinations, he felt that a more practical and technical approach was needed, using experts and the ILO network.

When Briand gave his speech future prospects still looked promising. But one month later Wall Street crashed, signifying a turning point in Europe’s economic fortunes. Hence when the CEEU commenced its work, circumstances had changed significantly. Unemployment had become a major concern. It was precisely this concern that provided Thomas a pretext to enter the process: unemployment clearly was an issue within ILO’s competence. While he focused on the design of a public works programme, he fully embraced the underlying political project of creating some form of European unification. The report submitted to the CEEU explicitly mentioned that the public works programme when implemented would develop that spirit of collaboration, that European spirit which is the object of the Commission of Enquiry for European Union to foster.

The CEEU accepted the proposal in May 1931. It created a Committee on Questions relating to Public Works and National Technical Equipment to deal with it. It drew its members from the LoN, the ILO and the CEEU. The committee sent around a questionnaire to thirty European countries for making an inventory of national plans, not only for motorways, but also for electricity networks.

Aligning the Puricelli Network to Thomas’ Initiative

In the plan for public works submitted to the CEEU, Thomas referred not only to the Puricelli-Hafraba-Lainé plans, but also to a plan proposed to ILO by Francis Delaisi, an influential French economist and journalist, and a friend of Thomas.
Delaisi was deeply involved in the European movement where he stressed the importance of connecting the agricultural Eastern and industrialised Western Europe, a dominant theme in schemes for European unification. Infrastructural connections were considered pivotal for this. Connections between Western and Eastern Europe were indeed missing from the 1927 Puricelli plan, which had a strong north-south focus and aimed to connect France, Germany and Italy. Thomas’s scheme got a lot of publicity, which led Willy Hof to contact Thomas.

Their contact led to an initiative organised outside the CEEU. This suited Thomas well. He anticipated that he could not only rely on the LoN and CEEU to get his public works programme implemented, as it had met with criticism in Geneva. For example, Pietro Stoppani, LoN Secretariat member and head of the Economic section had told Thomas that he considered his public works «projets de luxe». Thomas’s first step was organising an international road conference (Congrès Internationale des Autoroutes) from 31 August to 2 September in 1931, hosted in Geneva at the ILO.

At the conference Puricelli presented a first draft plan for a European network. It resembled his 1927 plan, but also had two notable extensions. It included the Pigelet-Lainé proposal as developed in 1929 as well as plans developed by the Hafraba member Theodor Golder. He had proposed to expand the Hafraba network with three extensions into Eastern Europe: to Königsberg via Danzig, to Warsaw and to Budapest. To accommodate Thomas, Puricelli included these in his 1931 plan (see figure 2). The conference resulted in the creation of a secretariat to coordinate the various initiatives. Lainé became the director and Puricelli the honorary president. Furthermore, a technical committee led by Puricelli would develop the first draft further and present it at the next international conference to be organised eight months later in Milan. At this second conference, a new plan, officially attributed to Thomas, was presented and adopted. To accommodate Thomas’s vision even further, it now included the Baltic to Balkan connection and a more full-blown extension into Central-Eastern and South-Eastern Europe down to Istanbul and Athens (see figure 2). It consisted of 14,000 km of motorways. The first 1000 km would be constructed in 1933 and result in 188,000 new jobs. It was projected that in 1937 this would already

---

38 This vision is most pronounced in F. Delaisi’s Les deux Europes (Paris, 1929).
39 See Van der Vleuten, «Europe’s System Builders», 329.
41 On these conferences see Schipper, Driving, chapter 3; and Heckmann-Strohkar, «Der Traum von einer Europäischen Gemeinschaft: Die Internationale Autobahnkongresse 1931 und 1932», in Die Schweizer Autobahn, ed. M. Heller and A. Volk, 32–45.
42 For his plan, see Varenkamp, «The Hafraba», 35.
43 Golder published his plan in the Hafraba-Mitteilungsblatt, 2 (1930), 1–3, see Ibid., 33–34.
amount to 750,000 jobs and a 4000 km long new motorway network. The discussion at the conference no longer focused on planning but on implementation, in particular on the issue how to finance the plan. Progress on this issue would be reported at the next conference to be held in spring 1933 in Frankfurt am Main where Hafraba had its central office. At that time the results of Thomas’s effort to organise international funding would be known. The participants were hopeful that their plans would ultimately be realised.

The meeting in Frankfurt, however, never took place. The international bureau vanished from the international scene. What happened? In the first place, Thomas died unexpectedly on 7 May 1932, which left the remainder of the European public works programme without its animator. In addition, the preparations for the International Monetary and Economic Conference to be held in June 1933 already indicated that no funding would be made available for international public works. Indeed, at the conference, the United States – the most important creditor – stressed that every country should raise its own funds.44

The final blow was delivered by Hitler’s rise to power in Germany, which induced Hafraba to change strategy. In early 1932 Willy Hof had several conversations with Hitler about the motorway plan, and in August 1932 Hafraba was dissolved and incorporated into the company preparing the construction of the Autobahnen (GeZuVor-Gesellschaft zur Vorbereitung der Reichautobahnen). The headquarters were moved from Frankfurt to Berlin, taking most of the original members of the executive board to the new company. Hitler personally appointed

Autobahn supervisor Fritz Todt as the new man in charge. All activities were refocused on building a national network. On 24 June 1933, the decision was taken to begin the construction of the first section of the Nazi Autobahn project, the Frankfurt-Darmstadt route. Germany became the frontrunner in motorway building. The Nazi leadership shared the assumption of technocratic internationalism that networks had the power to unite, but in their vision this could only happen under the leadership of Germany. Technology was central to the Fascist ideology, but directed by fascist politicians and not by experts. Kurt Kaftan, who had been involved in Hafraba but also worked for GeZuVor, was asked by Todt to prepare a European plan for motorways. In this plan technocratic internationalist thinking was clearly visible. In the preface, he wrote the plan was ‘intended to enlist the active forces of all European peoples in a work [...] wholly unpolitical, yet furthering the establishment of deeply rooted economic relations between all European nations, a work of labour glorified by the hope of our age: Peace to Europe’.

He argued that his basic method had been to design optimal national road networks for each country based on economic and traffic criteria. Subsequently, international connections would emerge once national plans were juxtaposed. This did not prove so difficult and suggested a harmony between national networks and his proposed European one. Yet at the same time, he argues at some length that Germany’s network should be the starting point for the design of the European network, as it took the lead in motorway building. This implies that when other national plans did not fit the planned German network had to be adjusted. Here the new direction taken by Hafraba in 1932 in response to the Nazi vision on international relations surfaced.

3. Electricity for Europe

A Laissez-Faire Regime

Thomas also included a scheme for a European electricity network in his European public works plan. He was neither alone nor first in envisioning a European electricity network. Since the start of the twentieth century the international electro-technical community was in favour of international cooperation and regarded international connections a logical extension of local and regional networks emerging within national borders. At the end of World War I, a number

---


46 K. Kaftan, Europa braucht Autobahnen (Berlin, 1936). The plan was published in German, French and English.

47 Idem, 12–16.

48 This history has been described in greater detail in V. Lagendijk, Electrifying Europe. The Power of Europe in the Construction of Electricity Network, PhD thesis Eindhoven University of Technology (Forthcoming, Amsterdam, 2008).
of cross-border connections existed: around the Rhine between France, Switzerland and Germany; between Italy and Switzerland; as well as a submarine cable between Denmark and Sweden. The growing internationalisation was further reinforced by the founding of a number of international engineering organisations such as the Union Internationale de Producteurs et Distributeurs d’Énergie Électriques (UNIPEDE, 1925) and the World Power Conference (WPC, 1924).

Yet postwar years also witnessed a growing role for public authorities. Governments interfered in electricity prices and came to regard electricity as a national public service. Therefore, electricity consumption was encouraged by stimulating and subsidising network expansion. Domestic industry and resources were protected by tariffs and quotas, limiting the growth of electricity exchanges across borders. The international engineering community did not challenge this development but was concerned that processes of electrification would remain confined within national frontiers.

Expanding the range of local networks held several advantages. Interconnections between coal-fired plants and hydroelectric plants resulted in a better economic mix, as it was more economical to use hydroelectricity than to burn expensive coal. The interconnection of different systems enabled the transmission of electricity from one utility to the other in cases of emergency and often led to a better usage of plant capacity. These processes worked within national settings, but engineers knew that savings would be even greater if networks grew across national borders. Such cross-border links between national, local and regional electricity companies were operated in the 1910s, although on a limited scale.

In line with our argument of technocratic internationalism, engineers sought to align national and international development by harmonising national legislation and remove barriers to international exchange as much as possible. This was, for example, a prominent topic at the 1926 WPC, where a session was devoted to international exchange of electricity. Most papers in this session argued for a laissez-faire regime, implying that governments should not interfere with international exchanges but leave it to electricity companies. While acknowledging the benefits of developing national networks, Swiss Professor Landry argued that there would still be periodical or permanent surpluses, or shortages of energy. He concluded that economically and technically speaking, «Everything speaks in favor of the exchange of energy between countries.»

49 See Ibid., section 2.1.
50 G. Siegel describes several other countries including France, Portugal, Belgium and Luxembourg in Die Elektrizitätsgesetzgebung der Kulturländer der Erde (Berlin, 1930).
52 An emergency intervention whereby utilities in France and Switzerland helped out Italian utilities in 1922 is often referred to. See Lagendijk, Electrifying, chapter 2.
Plans for European electricity networks
The establishment of a laissez-faire regime was not the only strategy discussed by electricity engineers. Ideas of international rationalisation, cartelisation and planning gained popularity in the 1920s and were dominant at the International Economic Conference (IEC) of 1927. Hope was placed on economic integration to circumvent the problematic political relationships between states. Its initiator, French industrialist and politician Louis Loucheur, wanted to include only leading men from finance, industry and experts to prepare the conference. He envisaged an economically unified Europe based on industrial cooperation, in particular along a Franco-German axis, and saw the IEC as a means to forge it. Delaisi, who would propose a motorway plan to ILO, was part of the French delegation. One IEC report suggested that the growth of electricity networks and generation units eventually led to cheaper current, stressing that «In this domain a great opportunity is offered to neighbouring nations to collaborate for the advancement of their industry and the prosperity of their people». The IEC added to the positive spirit following the Locarno treaty in 1925, which had rehabilitated Germany’s position in Europe and helped to strengthen the European movement.

Inspired by this movement and the IEC, electrical engineers not only came to think in international but also in European terms. In 1929, a proposal for a European electricity network was made by French engineer George Viel, the director of a company co-owned by Loucheur. He regarded a continental grid at 400 kV as a rational option. Others developed similar ideas, but it was the idea for a European network by German engineer Oskar Oliven which became the synonym for European network plans in engineering circles. In a 1930 address at the WPC, he presented a plan for a super European network (see figure 3). Oliven argued that

54 Pemberton, «New Worlds for Old».
electricity lines were already traversing borders, but a next step should be taken to "organize co-operation of the political and economic factors of our Continent." He proposed a network of approximately 9750 km, with five main 400 kV lines. Unlike in the case of the European motorway plans, this was not based on a combination of other existing plans. Instead he devised a master plan for a European network that would exploit existing energy sources to effect better and help to manage peak loads.

Oliven’s plan received wide attention partially because of the work of another important proponent of connecting Europe electrically: engineer and industrialist Dannie Heineman. The two knew each other well. Like his one-time business associate Loucheur, Heineman had argued for an international cartel of electricity producers and distributors in 1927. To Heineman, only international collaboration enabled a technically and economically rational exploitation of natural resources. Heineman wrote the preface to the influential Les deux Europes by Delaisi. Like the latter, Heineman disapproved of the so-called "broken economic harmony" between "horse-powered Europe" and "horse-drawn Europe." Hein-

---

63 Ibid., 1.
65 After studying together in Germany, Heineman’s holding company SOFINA came to own a quarter of the shares of Oliven’s enterprise GESFÜREL in 1922. See Ibid.
man advocated electrifying backward regions to stimulate industrialisation in order to «abolish by kilowatt [...] the imbalance caused by horse-power».

Both Oliven and Heineman stressed that an electrified Europe should become the object of a general study. This led Belgian minister of foreign affairs Paul Hymans, with whom Heineman had contact, to invite the CEEU to undertake the proposed study in December 1930. Hymans was a strong opponent of closer European economic cooperation. Like many engineers, he also claimed that «National legislation should not stand in the way of such a program». The two main effects of such a network were firstly, to ensure an intensive and rational exploitation of Europe’s energy resources and secondly, to create a «communauté d’intérêt» between countries. As with the motorway plans, the myth of networks also surfaced here as a European network was imagined to perform a peace-keeping function.

The Committee of Electrical Questions, part of the LoN Organization for Communications and Transit (OCT), took up the issue raised by Hymans and Thomas’s proposal since April 1931. Most initiative came from the OCT Secretariat, spurred by the international electro-technical community, which was more than inclined to influence this LoN Committee. In February 1932 UNIPEDE President Marcel Ulrich wrote to the League Secretariat about the pending study into a European electricity network. He explained that industrialists within UNIPEDE were very interested in creating a European network. Yet instead of focusing on building a planned European network, the OCT opted for a strategy of gradually developing an international electricity system.

This view was also shared by the international electro-technical community. A report by the OCT Secretariat on the 1933 WPC meeting provides interesting insights into the different prevailing visions on how to organise electricity supply in Europe. Generally speaking, engineers agreed that such an European network was economically rational. But the significant differences between countries with well-developed electricity infrastructure and those without also had to be taken into account. Not only would it need a vast amount of capital, but lesser developed

68 Ibid., 17. Authors’ translation.
69 Ibid., 18–19; and Oliven, «European», 10.
70 Lagendijk, Electrifying, 69–72.
71 Pegg, Evolution, 137–8.
74 LoN, 9E/R-2572/1668/1668, President UNIPEDE to Stoppani, Paris, 16 February 1932.
75 LoN, 9E/R-4286/3015/1777, «Session spéciale de la Conférence Mondiale de l’Energie, Stockholm 1933».
76 Ibid., 5.
countries were not ready for such a «rational development». To many engineers, Oliven’s plan appeared purely theoretical and perhaps also too political because of its top-down character. Some remarked that transmission lines in Oliven’s plans hardly matched with existing ones. Overall, there was a consensus that international connections should be built first between regional and national networks; cross-border electricity exchange could cover immediate needs before a European system was completed.

As in the case of the motorways, Thomas anticipated that his plans for public works would not be implemented in a LoN context. Instead, he undertook a private initiative, relying upon a group of experts from engineering and finance including Ulrich and Heineman. In December 1931 he met Georges Lemaître, delegated administrator of the Banque Générale pour l’Industrie Électrique, who offered his services. Lemaître was not convinced that the proposed «super network» at 400 kV was an «immediate technical and economic necessity». According to him, the advantages of 400 kV were only useful for transmitting electricity over very long distances of around 1000 km. Instead, he advocated the creation of a European network by welding together emerging regional and national networks. Thomas’s circle of experts adhered to this conclusion. Thomas did not succeed in convincing Lemaître of the importance of the two prime aims of his plan: reducing unemployment and creating a «New Europe». Thomas was clearly disappointed to see his original plan amended and he lost interest. His unexpected death in 1932 ended all further efforts.

By 1933, the initiatives by Hymans and Thomas had made little headway. Discussions about the best way of connecting Europe electrically had produced a consensus that a top-down European approach would not work. The OCT concluded in 1933 that due to economic and political circumstances it was not «possible to anticipate in the near future either the institution of a more liberal regime for the exchange of electric power or the constitution of a European electric system». The notion of a planned network did make a comeback in the following years. Faced with wartime energy needs, Nazi engineers envisioned an electricity network spanning the European continent and substantial hydroelectric

77 Ibid., 3.
78 Ibid., 3.
81 He wrote that «our electrician friends have thrown me a small disillusionment». ILO, CAT 6B.7.3, Letter to Henri Cahen (Paris), December 29, 1931.
units were projected in Norway and Austria. Yet only a minor portion of this network had been built by 1945.

4. The Legacy of Interwar Technocratic Internationalism

Despite the solemn words spoken of the significance of European road and electricity networks, plans for building them seemed to be forgotten at the end of the interwar years. Should these plans thus be considered failures? After all, the European public works plan had been called utopian and the work of dreamers all along. In fact, this echoed criticism aimed at much of the idealist thinking of technocratic internationalism and the work of international organisations such as the ILO and LoN. In a private letter, Thomas expressed his frustration that his plans were called dreams and that he was advised to focus on the national level even by people within his own organisation. The criticism was influential and eventually watered down his initiative within the CEEU and LoN. Yet to conclude that these plans for European networks were utopian from the start, that they stood no chance of success because of the power of nation-states and finally, that they had no real impact in the interwar years, would be anachronistic, whiggish and simply wrong.

Firstly, following the first difficult years after the Great War, the future seemed bright again for international collaborative efforts from the mid-1920s onwards. Discussions about new international relations were the talk of the day, schemes for European unification proliferated, the economy seemed to stabilise and new treaties were signed. The plans discussed here originated in this optimistic political climate which included high expectations of relatively new network technologies. Secondly, the plans grew out of a network of influential people and they were circulated and much discussed in international engineering networks. Within these contexts, top-down plans for these European networks and the technocratic thinking behind them represented a serious alternative. This is not to

85 See, for example, the influential E.H. Carr in his The Twenty Years’ Crisis first published in 1939. In his perspective, international relations were fully dominated by nation-states’ foreign policies and their perceptions of their own interests, and any plan that would impinge on their sovereignty would fail. S. Pederson has pointed out that only recently the importance of the «technical» work of the LoN has been identified. See her «Back to the League of Nations», The American Historical Re- view 122 (2007) 4, 1091–1117.
86 Cited in Schipper, Driving, chapter 3.
deny that they were heavily contested. Many engineers preferred a more gradual internationalisation of networks.

The interwar discussions on European infrastructures left an important legacy. This consisted, firstly, of a clear vision on how to construct European infrastructures, and secondly, the articulation of various elements of technocratic internationalism and experience with trying them out in practice. Both would guide reconstruction and network expansion activities after World War II. The transmission over time (and across national boundaries) was not only possible due to human network formation between various engineers and other groups, both formal and informal, but also a result of this legacy.

In the 1920s, when road and electrical engineers and their international organisations began to think about building international motorways and electricity systems, they did not emphasise so much the idea of unifying Europe but the economic development it would bring to the involved nations, although the argument that networks deliver peace was never far away. When engineers aligned themselves with Europeanists, in particular due to the work of the ILO and LoN, the uniting power of network was evoked more strongly. As a consequence, some engineers began to work on top-down plans for very large European-wide networks, expecting that these infrastructures could bring political integration through the detour of economic integration. Ensuing discussions among engineers proved that while many of them did not agree with top-down planning, the effort to construct European networks was generally accepted. The end result was that they settled for an intermediate strategy of welding together emerging national interconnections towards some form of European unity.

As discussions about European networks continued after World War II, road and electricity engineers had ready-made ideas about how they wished to implement the concept of a European network. In the case of motorways, this led to development of the E-road network, which connected selected national motorways that would be built or upgraded according to agreed European standards. Building on interwar discussions, the engineers did not want to design a network top-down, as the involved American experts would have preferred. In 1950, the United Nations Economic Commission for Europe (UNECE) agreed on the «Declaration on the Construction of Main International Traffic Arteries». In this declaration, that included the Eastern European states, the linking of motorways was once again seen as an effective means to prevent future wars and unite Europe. This was not much different for electricity networks, which gained a prominent place in post-World War II planning. Schemes drawn up in Washington D.C. and Paris in the European Recovery Programme framework and in Geneva by the UNECE

87 The Puricelli plan circulated in American policy circles. See Schipper, Driving Europe, chapter 6.
again aimed to impose top-down plans for a European network. The engineers that sat at the conference tables in Paris and Geneva refuted these suggestions. A seminal report of the time stressed that an informal organisation of utilities was the best way to gradually establish a European system.\textsuperscript{88} Interwar plans like Oliven’s were generally regarded as premature.\textsuperscript{89}

Technocratic internationalism thrived after World War II in various newly established international organisations such as the OEEC and UNECE, but also in many of the international engineering organisations.\textsuperscript{90} Based on the interwar experience, they were able to construct a range of networks in Western Europe which were instrumental for the creation of the economic miracle in the post World War II world. When Gunnar Myrdal, the first Secretary General of UNECE, reflected upon his time with the organisation and its successful work on networks, he stressed that:

«This could be accomplished by stressing the technical, non-political nature and by avoiding all publicity around them. […] The greatest secrecy was kept up: the committees met in private, had no formal rules of procedure, no records were kept except an account of agreements reached between all or a number of states, and no votes were ever taken. The state officials acted together with the Secretariat as restricted «clubs», keeping much independence towards their home governments and anyhow avoiding public interest and debate […] All this activity was secret diplomacy, the history of which has not as yet been written.»\textsuperscript{91}

5. Conclusion

The argument in this article matches forms of transnational history which stress the importance of movements and forces that cut across national borders.\textsuperscript{92} It shows that national and international developments cannot be studied as mutually exclusive or only competitive because doing so does not capture the complex relations between these levels. For example, to understand the persuasive power of the motorway concept at the national level, we must look at the preceding trans-


\textsuperscript{89} More details see Lagendijk, \textit{Electrifying}, section 4.6.

\textsuperscript{90} See J. Schot, «Transnational Infrastructures and the Origins of European Integration?», in \textit{Europe materializing}?


national history of exchange and networking among engineers. This exchange led to a process of comparing national practices, the development of a shared and well articulated understanding of what a road network should be like, and consequently to the formulation of best practice. The international discussions among engineers inspired by their technocratic internationalism had been crucially important in this process. They not only brought the engineering community together and facilitated production and circulation of new knowledge, but also created standards and powerful ideas for how to construct national and international networks. A similar case can be made for electricity networks. The two stories told in this article lend support to the argument that cross-border networks of people, in which individuals such as Puricelli, Thomas or Oliven often played a key role, could be very influential.
Internationalisme technocratique pendant l’entre-deux-guerres: La construction d’Europe par des autoroutes et des réseaux électriques

L’article montre que deux idéologies importantes de l’entre-deux-guerres, l’internationalisme et la technocratie, fut combinées dans un ensemble d’idées convaincants qui aidait à concrétiser les tentatives pour unifier l’Europe. Ces idées englobent le point de vue que des réseaux contribuent à l’unification des nations et à la paix. De plus, l’article traite des intérêts, tant nationaux qu’internationaux, qui peuvent être réconciliés par une méthode adaptée à la collaboration. Cette méthode doit impérativement chercher à séparer la sphère technique de celle de la politique. L’article analyse non seulement comment l’internationalisme technocratique était décrit et influençait la planification des autoroutes internationales et des réseaux électriques, mais aussi comment il était lié aux points de vue des nouvelles organisations internationales comme la Sociétés des Nations ou l’Organisation internationale du Travail. Les projets et discussions aboutissaient à une vue particulière sur la manière de construire des réseaux européens, une vue qui devait influencer la construction des réseaux après la Seconde Guerre mondiale en Europe.

Johan Schot
Technical University Eindhoven
IPO Building
P.O. Postbus 513
5600 MB Eindhoven
THE NETHERLANDS
e-mail: j.w.schot@tue.nl

Vincent Lagendijk
Eindhoven University of Technology
IPO 2.03
PO Box 513
5600 Eindhoven
THE NETHERLANDS
e-mail: v.c.lagendijk@tue.nl