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Creating the Conditions for Western European Petroculture: The Marshall Plan, the Politics of the OEEC, and the Transition from Coal to Oil

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Résumé

In the postwar years, petroleum products pervaded more and more aspects of Western European life. In this article, we study the origins of this pervasive petroculture through the lens of the Marshall Plan/European Recovery Program (ERP), its Refinery Expansion Program, and the politics of the Organisation of European Economic Co-operation (OEEC). To that end, we examine the creation and expansion of technological infrastructures for petroleum, the institutions that promoted its growing use, and how those changes enabled the transition from coal to oil. The case is made that the ERP and OEEC had a key role in the making of a pervasive petroculture in Western Europe.

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INTRODUCTION

1 The first report of the Technical Oil Committee of the Organisation of European Economic Cooperation (OEEC) from 1956, referred to oil as the "life-blood of industry, agriculture, and transport."[1] Without oil, "the economic life of countries, technical progress and indeed the promotion of prosperity of the individual would be seriously retarded."[2]

2 These statements might seem unsurprising given the obvious centrality of oil to our current ways of life. In 1956, however, the report of the Technical Oil Committee captured a major ongoing change in Western Europe. Oil had been produced commercially in Imperial Russia, the U.S. as well as Central and Eastern Europe from the mid-19th C. Yet the timing and the scale of the breakthrough of oil differed substantially from place to place.[3] While the U.S. embraced mass motorization and oil use in the interwar years, Western Europeans remained reluctant. This changed after 1945. Within only a decade, oil was adopted across the energy spectrum and pervaded more and more aspects of modern life.

3 How and why did oil become so pervasive in post-WWII Europe? This article elaborates on the role of oil in the reconstruction of Western Europe. We seek to examine what kind of role the European Recovery Program (ERP), also known as the Marshall Plan, and the OEEC played for the postwar "oiling" of Europe. To understand the rise of oil, it is important to recognize that oil does not flow by itself. Crude oil and petroleum products could only pervade modern life because their flow was enabled by the construction of petroleum infrastructures, the organization of reliable crude oil supplies, and consumers of energy adopting petroleum-based technologies. Announced in June 1947 by US-Secretary of State George C. Marshall, the ERP only concerned Western Europe, as the USSR refused to participate and forced Central and Eastern European satellite states to follow suit. At the initiative of France and the U.K., 16 other nation states then formed the so-called Committee of European Economic Co-operation (CEEC) in July 1947,[4] succeeded by the OEEC in early 1948.

4 The overarching mission of the ERP was to functionally interlock infrastructure systems across national borders,[5] selectively expand key industries,[6] and integrate national economies into a transatlantic trading area. It was expected that economic growth would impede electoral success of Communist parties in Western Europe, and thus contain Soviet influence.[7] To achieve these goals, substantial attention was given to the refinery industry to provide both fuel that would boost outputs of agriculture, industries, and transport systems, and inexpensive raw materials for the chemical and construction industries.[8] In that sense, the growth of

1 Organisation for European Economic Co-Operation (OEEC), *Report of the Oil Committee to Be Published in 1956* (Paris: OEEC, 1956), 3.

2 Ibid.

3 For an overview, see Chapters 3-6 in Daniel Yergin, *The Prize: The Epic Quest for Oil, Money, and Power* (New York: Simon and Schuster, 1991).

4 Founding members of the CEEC were the United Kingdom, Austria, Belgium, Denmark, France, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland, and Turkey, see: Committee of European Economic Co-Operation (CEEC), *Volume I, General Report* (London: His Majesty's Stationary Office, 1947), 1.

5 Frank Schipper, "Changing the Face of Europe: European Road Mobility During the Marshall Plan Years", *The Journal of Transport History,* vol. 28, n°2, 2007, 211-228; Frank Schipper, Johan Schot, "Infrastructural Europeanism, or the Project of Building Europe on Infrastructures: An Introduction," *History and Technology,* vol. 27, n°3, 2011, 245-264; Vincent Lagendijk, *Electrifying Europe: The Power of Europe in the Construction of Electricity Networks* (Amsterdam: Aksant, 2008).

6 Matthias Schmelzer, "The Growth Paradigm: History, Hegemony, and the Contested Making of Economic Growthmanship," *Ecological Economics*, vol. 118, 2015, 262-271; Matthieu Leimgruber, Matthias Schmelzer, "From the Marshall Plan to Global Governance: Historical Transformations of the OEEC/OECD, 1948 to Present", *in* Matthieu Leimgruber and Matthias Schmelzer, *The OECD and the International Political Economy Since 1948* (Cham: Palgrave Macmillan, 2017), 23-6.

7 Alan S. Milward, *The Reconstruction of Western Europe, 1945-51* (London: Methuen and Co., 1984); Michael J. Hogan, *The Marshall Plan: America, Britain and the Reconstruction of Western Europe, 1947-1952* (Cambridge: Cambridge University Press, 1989).

8 Robert Groß *et al.*, "How the European Recovery Program (ERP) Drove France's Petroleum Dependency,

oil consumption in Western Europe, i.e. in the ERP-countries, went hand in hand with the U.S. becoming "an empire by invitation", as Geir Lundestad argues.[9] It is thus unsurprising that the quoted OEEC's oil report of 1956, when it spoke of oil as "lifeblood", echoed earlier assertions in the U.S.[10] In contrast to the trajectory of the OEEC countries, Central and Eastern Europe remained predominantly coal-based.[11]

5 This article is grounded in the research literature on the Marshall Plan and oil. Drawing on Ethan Kapstein's and David Painter's pioneering historical work on the place of oil in the postwar diplomacy of the U.S., and in the Marshall Plan more specifically,[12] we examine the ERP's Refinery Expansion Program as a window of opportunity for transfers of capital, technology, knowledge and raw materials across the Atlantic. Furthermore, taking inspiration from Painter's call for "further work comparing and contrasting each participating country's experience over time",[13] we highlight the uneven importance of the ERP, depending on national circumstances.

6 Additionally, the analysis builds on work by Henning Türk and Rüdiger Graf, who examine OEEC activities in the field of energy through the lens of the oil price crises of the 1970s. The authors conclude that the OEEC failed in their mission to navigate Western Europe through these crises, as the committees in charge were dissolved following the first oil price crisis and its agenda transferred to the International Energy Agency.[14] Their assessment is similar to that of Alan Milward, who saw the OEEC as primarily concerned with holding regular meetings and collecting vast amounts of data.[15] However, as Mathieu Leimgruber and Mathias Schmelzer argue, such a conclusion might hold true "in light of early American plans for European integration, [but] it ignores crucial soft-power functions that came to characterize OEEC (and then OECD) work."[16] According to Leimgruber and Schmelzer, the most important soft power tool within the OEEC was an institutionalized, mutual peer review, in which delegates presented and defended national plans, ultimately agreeing on a common understanding of the problem and approaches to solving it. Those who deviated were not sanctioned politically or financially, but they had to justify themselves socially.[17] Based on an examination of archival materials and OEEC publications, we point to the OEEC's and particularly its Technical Oil Committee's hitherto underestimated role in shaping postwar petroleum relations.[18]

7 As we find it necessary to look beyond international organizations and diplomacy to understand the rise of oil, we relate this history to

1948–1975," *Environmental Innovation and Societal Transitions,* vol. 42, 2022, 268-284.

9 Geir Lundestad, "Empire by Invitation? The United States and Western Europe, 1945-1952", *Journal of Peace Research*, vol. 23, n°3, 1986, 263-277.

10 Matthew T. Huber, *Lifeblood: Oil, Freedom, and the Forces of Capital* (Minnesota: University of Minnesota Press, 2013), 3, 42 and 47.

11 Jan Kovanda, Tomas Hak, "Historical Perspectives of Material Use in Czechoslovakia in 1855–2007", *Ecological Indicators*, vol. 11, n°5, 2011, 1375-1384; Fridolin Krausmann *et al.*, "The Metabolic Transition of a Planned Economy: Material Flows in the USSR and the Russian Federation 1900 to 2010," *Ecological Economics*, n°124, 2016, 76-85.

12 David S. Painter, "Oil and the Marshall Plan", *The Business History Review*, vol. 58, n°3, 1984, 359–83; David S. Painter, *Oil and the American Century: The Political Economy of U.S. Foreign Oil Policy, 1941-1954* (Baltimore: The Johns Hopkins University Press, 1986); David S. Painter, "The Marshall Plan and Oil," *Cold War History*, vol. 9, n°2, 2009, 159-175; Ethan B. Kapstein, *The Insecure Alliance: Energy Crisis and Western Politics since 1944* (Oxford: Oxford University Press, 1990).

13 Painter, "The Marshall Plan and Oil", 170 (cf. note 12).

14 Henning Türk, "The Oil Crisis of 1973 as a Challenge to Multilateral Energy Cooperation Among Western Industrialized Countries", *Historical Social Research/ Historische Sozialforschung*, vol. 39, n°4, 2014, 209-230; Rüdiger Graf, *Oil and Sovereignty: Petro-Knowledge and Energy Policy in the United States and Western Europe in the 1970s* (New York: Berghahn Books, 2018).

15 Milward, *The Reconstruction*, 145, 158 (cf. note 7).

16 Leimgruber, Schmelzer, "From the Marshall Plan to Global Governance", 29 (cf. note 6).

17 Schmelzer, *The Hegemony of Growth: The OECD and the Making of the Economic Growth Paradigm* (Cambridge: Cambridge University Press, 2016), 64-65.

18 Leimgruber, Schmelzer, "From the Marshall Plan to Global Governance", 29 (cf. note 6). See also: Schmelzer, "The Growth Paradigm", 262-271 (cf. note 6); Leimgruber, Schmelzer, "From the Marshall Plan to Global Governance", 23-26 (cf. note 6).

energy and environmental history. Proponents of the concept of the Anthropocene have used the term Great Acceleration to denote the sharp increase of human activity and environmental impact after 1945[19] that are linked to a pronounced growth of petroleum product consumption.[20] As Richard Lane argues in this context, the Great Acceleration was not just a self-reinforcing process driven by cheap oil, but accompanied by government agencies, which planned for the management of scarce resources.[21] Ted Steinberg thinks along similar lines when he asks about the relationship between capitalism and the Great Acceleration.[22] Our analysis adds to these debates. It focuses on the intertwining of the economic growth paradigm – a central concern of the OEEC[23] – with the growing consumption of petroleum products into a common value system. This distinct form of petroculture was shared over the years by thousands of bureaucrats all over Western Europe and accompanied the transition of energy systems in Western Europe from coal to oil.[24]

8 Conceptually, this article provides a case study for the historical origins of pervasive petroculture under examination in this special issue. Scholars studying *petroculture* in its historical and contemporary forms typically define it as the "representations and symbolic practices that have infused, affirmed, and sustained the material armatures of the oil economy *and* helped to produce the particular modes of everyday life that have developed around oil use".[25] There are two major elements in such definitions. First the attention paid to symbolic practices, which the field of petrocultures has for the most part studied through cultural forms recognized as such, e.g., novels, music, films or magazines. Secondly, scholars in this field simultaneously emphasize how pervasive oil has become; how entangled with petroleum "we", "as modern humans", and "our definition of life", have become.[26]

We draw on both of these elements to varying degrees. The pervasiveness and the merging of the paradigm of economic growth and oil is at the heart of this article: we investigate the making of the stable configurations of petroleum supply, distribution and consumption that gave oil a crucial role in economic and everyday life. When we speak of a (European) pervasive petroculture, our focus is mainly on those processes that allowed oil to become part of many social practices. In our study, however, we limit the analysis on petroleum as fuel, as petrochemicals played only a subordinated role until the 1960s. Nonetheless, it must be said that the conditions for their later growth were also created with the refinery upgrade. 9

The idea of oil as "lifeblood", as used in the OEEC report quoted above, is one such representation. This is where we add to the definition of petroculture, in that we suggest that a specific, localized "petroculture" emerged in the OEEC, or at least in its technical oil committee, which also 10

19 Will Steffen *et al.*, "The Anthropocene: Conceptual and Historical Perspectives", *Phil. Trans. R. Soc. A*, n°369, 2011, 842-867, here 849-853.

20 Pfister, "The "1950s Syndrome" and the Transition From a Slow-Going to a Rapid Loss of Global Sustainability", *in* Frank Uekötter (ed.), *The Turning Points in Environmental History* (Pittsburgh: University of Pittsburgh Press, 2010), 90–117.

21 Richard Lane, "The American Anthropocene: Economic Scarcity and Growth During the Great Acceleration," *Geoforum*, vol. 99, 2019, 11-21.

22 Ted Steinberg, "Can Karl Polanyi Explain the Anthropocene? The Commodification of Nature and the Great Acceleration," *Geographical Review*, vol. 109, n°2, 2019, 265-270.

23 Schmelzer, *The Hegemony of Growth* (cf. note 17).

24 Odinn Melsted, Irene Pallua, "The Historical Transition from Coal to Hydrocarbons: Previous Explanations and the Need for an Integrative Perspective," *Canadian Journal of History,* vol. 53, n°3, 2018, 395–422; Marten Boon, *Multinational Business and Transnational Regions: A Transnational Business History of Energy Transition in the Rhine Region, 1945-1973* (New York: Routledge, 2018).

25 Ross Barrett, Daniel Worden, "Introduction", *in* Ross Barrett and Daniel Worden (eds.), *Oil Culture* (Minneapolis: University of Minnesota Press, 2014), xxiv. See also Imre Szeman, *On Petrocultures: Globalization, Culture, and Energy* (West Virginia University Press, 2019); Wilson Sheena, Szeman Imre, Carlson Adam, "On Petroculture: Or, Why We Need to Understand Oil to Understand Everything Else", *in* Sheena Wilson, Adam Carlson and Imre Szeman (eds.), *Petrocultures: Oil, Politics, Culture* (McGill-Queen's Press-MQUP, 2017), 3-19.

26 Stephanie LeMenager, *Living Oil: Petroleum Culture in the American Century* (Oxford: Oxford University Press, 2014), 7. See also Huber, *Lifeblood* (cf. note 10).

contributed to giving oil such a dominant role. The emphasis on the ubiquity of petroleum in modern life and culture might give the impression that it determines all social and cultural relations, an agency possibly deriving from its physical properties. This is not our intention. On the contrary, we stress that the historical processes behind the rise of oil cannot be grasped by looking at the material aspects alone, but have to include the construction and reinforcement of relationships to petroleum that are inextricably technical, economic, political and cultural.

11 To explore these multiple dimensions, this article examines three entangled processes, which correspond with the three main chapters. The first process (Section 2) deals with the ERP as a means of modernization of the relatively small and outdated refining infrastructure. We elaborate on ERP funding that allowed for imports of large quantities of crude oil and refined products, and also examine how Western Europe was integrated into the global crude oil trade. The second process (Section 3) was political and cultural. Here we examine the coordinating role of the OEEC's Technical Oil Committee when faced with bottlenecks and the Suez Crisis, as well as, conversely, with a projected excess of refining capacity in the 1960s. The rationale of the ERP and the OEEC's technical committees was to promote economic growth by reducing operation costs based on novel energy carriers that provided larger amounts of energy for the same expenditure. The third process (Section 4) is concerned with the long lasting effects of the ascent of oil on the energy economy. Here we extend the perspective to the choices of energy consumers, as incumbent coal was largely – but not entirely – substituted with oil-based alternatives for transportation, residential and industrial uses. Thereby, existing petroleum dependencies were reinforced and new ones created, as petroleum pervaded into the energy sectors that had previously been dominated by coal.

12 In doing so, we consciously focus on the ERP and OEEC as forces that coordinated the postwar growth of oil. This does not mean that we are unaware of the many other actors involved in an oil-based energy system, such as the oil industry, car manufacturers, policymakers or the military. A detailed analysis of those actors, however, is beyond the scope of this article. Our argumentation highlights the role of the ERP and OEEC in expanding oil infrastructures and institutions to promote and coordinate this expansion.

PERVASIVENESS THROUGH INFRASTRUCTURES: ENERGY INDUSTRIES AND THE ERP

13 We shall begin with the big picture. From the mid-19th C. to the late 1940s, Western European oil consumption grew continuously, but overall remained a relatively minor energy source. Even in the 1930s, when automobiles became more common, petroleum products only supplied about 10 % of total energy consumption.[27] With hardly any major crude oil fields in Western Europe, most oil was imported as refined products. There were a few refineries that were built in the 1930s, and the refinery industry was concentrated in Austria, Italy, the Netherlands, France, and the U.K. The latter three countries primarily processed crude oil from the colonies in North Africa, the Middle East and Asia.[28] In 1938, roughly 60 % of petroleum products were imported.[29] This number

27 Astrid Kander *et al.*, *Power to the People: Energy in Europe over the Last Five Centuries* (Princeton: Princeton University Press, 2013), 256-257.

28 Walter M. Iber., *Die sowjetische Mineralölverwaltung in Österreich. Zur Vorgeschichte der OMV 1945-1955* (Innsbruck: Studienverlag, 2011); Carola Hein, "Oil Spaces: The Global Petroleumscape in the Rotterdam/the Hague Area", *Journal of Urban History,* vol. 44, n°5, 2018, 887-929; Carola Hein, "'Old Refineries Rarely Die': Port City Refineries as Key Nodes in The Global Petroleumscape", *Canadian Journal of History*, vol. 53, n°3, 2018, 450-479; Daniele Pozzi, "The Natural Gas Industry in Italy Since Autarky Until Eni's Hegemony (1935–1965)", *in* Alain Beltran (ed.), *A Comparative History of National Oil Companies* (Brussels: Peter Lang, 2010), 233-263; Alexander Melamid, "Geographical Distribution of Petroleum Refining Capacities: A Study of the European Refining Program", *Economic Geography,* vol. 31, n°2, 1955, 168-178; Marie Williams, "Choices in Oil Refining: The Case of Bp 1900–60", *Business History*, vol. 26, n°3, 1984, 307-328.

29 E. Groen, "The Significance of the Marshall Plan for the Petroleum Industry", *in Third World Petroleum Congress, The Hague 1951, Proceedings. Section X: Economics and Statistics, Documentation, Education and Training, Legislation*, (Leiden: E. J. Brill, 1951), 58-96, here 61-62.

increased to 76 % in 1947, due to effects of WWII, such as destroyed refineries, storage tanks and rail tank cars, whose repair was hampered by the ubiquitous lack of steel, iron and tin.[30] Overall, coal remained the main fuel of Europe until the 1940s. In the 1920s and 1930s, coal is estimated to have supplied around 92 and 89 % of total primary energy consumption in England and Germany respectively. While those were countries with substantial domestic reserves, coal also accounted for 79 % in France in the 1920s and 73% in the 1930s.[31]

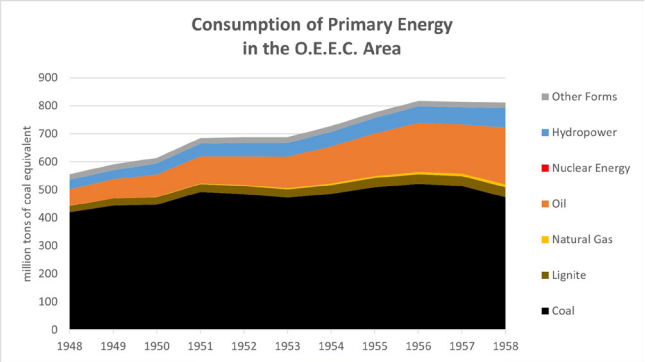

Figure 1: Inland Consumption of Primary Energy in the OEEC Area, 1948-1958. Source: OEEC, *Towards A New Energy Pattern in Europe. Report Prepared by the Energy Advisory Commission Under the Chairmanship of Austin Robinson* (Paris: OECD, 1960), Table 2.

14 The pre-eminence of coal, the restricted role of oil products, and the fact that they were mostly imported: this all changed progressively after 1947. Indeed, between 1948 and 1958, the consumption of oil products more than tripled, from 58 to 203 million tons of coal equivalent (mtce), whereas hard coal and lignite consumption only increased slightly from 443 to 509 million mtce but decreased thereafter (see Figure 1). At the same time, Western European oil refinery capacities grew ninefold, from 41.2 to 380.3 million t, and almost doubled in the following five years, thereby enabling the expansion of petroleum consumption.[32]

Direct Impacts of the ERP

When evaluating the effects of the ERP, it is 15
important to distinguish direct and indirect effects, as Painter and Kapstein suggest. The *direct* influence of the ERP consisted in financing the import of petroleum products. To enable the economic growth envisioned in the first report issued by the CEEC in September 1947, the so-called "Paris Report", various challenges had to be addressed. Those concerned both the supply of essential goods (e.g. raw materials, production equipment) and the "dollar deficit" of the participating countries, in other words the negative balance of exchange with the U.S.[33] Fuel was crucial to economic growth, but the production of coal suffered from wartime destruction and a lack of labour force, while the Cold War hampered trade with Central and Eastern European coal exporters.[34] The CEEC projected that coal outputs would recover their 1938 level by 1950, and slightly increase the following year.[35] However, it was clear that this recovery would not be sufficient to meet the projected growth in demand. Imports of coal would be needed as well as greater use of oil. The Paris Report estimated that oil requirements would grow 59 % by 1951 (68.7 million t) compared to 1947 (43.1 million t), and 106 % compared to 1938 (33.3 million t).[36]

The U.S. authorities deemed the goals laid out 16
in the Paris Report too optimistic. In addition, they feared ERP shipments would cause shortages in the U.S.[37] According to Kapstein, the

30 Painter, "Marshall Plan and Oil", 160 (cf. note 12).

31 National statistics available at *Energy History*. Url: **www.energyhistory.org.**

32 Willem Molle, Egbert Wever, *Oil Refineries and Petrochemical Industries in Western Europe: Buoyant Past, Uncertain Future* (Aldershot, Brookfield: Gower, 1984), 56, 165-169.

33 CEEC, *Volume I, General Report*, 6-8 (cf. note 4).

34 On the coal crisis, see e.g., Kapstein, *The Insecure Alliance*, 19-46 (cf. note 12); Robert Groß, "Kalorien, Kilowatt und Kreditprogramme. Das European Recovery Program (ERP) als Wendepunkt sozionaturaler Verhältnisse in Österreich?" *in* Ernst Langthaler and Robert Groß (eds.), *Zeitgeschichte*, Special Issue *Zeitgeschichte und Umweltgeschichte*, vol. 50, n°2, 193-215.

35 Committee of European Economic Co-Operation (CEEC), *Volume II, Technical Reports* (London: His Majesty's Stationary Office, 1947), 111.

36 Ibid., 138-139.

37 Thomas Robertson, "Conservation after World War II: The Truman Administration, Foreign Aid, and "The "Greatest Good"", *in* Karl Boyd Brooks (ed.), *The Environmental Legacy of Harry S. Truman* (Kirksville, Mo.: Truman State University Press, 2009), 32-47, here 35. National Archives at College Park, MD. Krug J. A., National Resources and Foreign Aid

U.S. had become a net importer of oil for the first time in 1947.[38] Nevertheless, oil ended up constituting one of the major subsidies of the ERP. Concerns of domestic shortage and rising prices for end users at home were taken up in the Foreign Assistance Act of 1948 by stipulating that crude oil and petroleum products had to originate "to the maximum extent practicable" from sources outside the US. As large Middle East oil fields were developed, shortages were off the table. However, the same clause helped to protect the profit margins of the US oil companies, especially of smaller domestic producers, against imports of cheap crude oil from the Middle East.[39] As Kapstein argues, the U.S. pursued a "hemispheric policy". Europe would be supplied from the Eastern Hemisphere (e.g. the Middle East), and the U.S. from the American continent.[40] In the end, the ERP directly financed about a quarter of the oil imported in OEEC countries between April 1948 and December 1951.[41] This amounted to 1.2 billion dollars, about 10 % of total ERP aid; less than, for instance, food/feed/fertilizers or machines and vehicles, but more than for coal.[42]

Indirect influences of the ERP

17 The ERP also influenced patterns of oil consumption in Western Europe in *indirect* ways, by helping to build oil infrastructure, in particular refineries. Indeed, the countries of the CEEC/OEEC aspired to build up refining capacities, arguing that dollar expenditures per imported energy unit would be lower if crude oil was imported instead of petroleum products, which would thus help to alleviate the dollar shortage. The U.S. authorities were split on the question. On the one hand, the lack of dollars meant that U.S. producers might face difficulties exporting to Europe. Oil companies operating in the Middle East would look to the U.S. as an outlet for their cheap oil, potentially harming domestic production. On the other hand, increased refining in Europe would harm the U.S. oil companies by helping their European-owned competitors.[43] Finally, the ECA drastically restricted the financing of refinery expansion in Western Europe.

18 The Paris Report of September 1947 had planned for an investment of US $588.2 million in oil equipment bought in dollars and a report on refinery expansion adopted by the OEEC in October 1949 estimated total expenditures equivalent to US $1 billion.[44] The sums furnished by the ECA pale in comparison. Between April 1948 and December 1951, the ECA provided only US $24 million to increase refining capacity.[45] After the official end of the ERP, the Mutual Security Agency (MSA) replaced the ECA and continued to release funds to previously approved projects, bringing the total ERP-related funding to a programmed US $36 million by April 1953, of which only US $23.7 million had actually been spent by that time.[46]

19 Even though the ECA declined to finance European refinery expansion, the ERP still played an indirect role in this evolution. Painter points out that several OEEC countries used their counterpart funds to increase refining capacity. The ERP "counterparts" were the equivalent in local currency of the dollar value of the goods shipped by the US government, paid by the importers and

Report, October 9, 1947, p. 5, in: Krug Committee File, Record Group 59, Historical Collection Relating to the Formulation of the European Recovery Program 1947-1950; National Archives at College Park, College Park, MD. Paris Report: Appraisal of Paris Report and Justification of Magnitude of Aid Recommended, Record Group 59, Historical Collection Relating to the Formulation of the European Recovery Program 1947-1950.

38 Kapstein, *The Insecure Alliance*, 61 (cf. note 12).

39 Painter, "The Marshall Plan and Oil", 165-167 (cf. note 12).

40 Kapstein, *The Insecure Alliance*, 68-70 (cf. note 12).

41 "ECA and MSA Relations with International Oil Companies Concerning Petroleum Prices", *in Monopoly and cartels* (Washington: United States Government Printing Office, 1952), 140, 150-152. When Painter writes that the ECA financed "[o]ver half (56 per cent) of the oil supplied [...] by US companies", one needs to pay attention to the qualifier "by US companies" (Painter, "The Marshall Plan and Oil", 164 (cf. note 12)).

42 Painter, "The Marshall Plan and Oil", 165 (cf. note 12).

43 Painter, "Oil and the Marshall Plan", 372-375 (cf. note 12).

44 Groen, "The Significance of the Marshall Plan", 80 (cf. note 29).

45 Painter, "The Marshall Plan and Oil", 168 (cf. note 12).

46 Mutual Security Agency (MSA), *European Industrial Projects: July 21, 1953* (Washington, D.C.: MSA Industry Division, Statistics and Report Division, 1953), 14.

Country	ERP total (Millions US $)	Petro aid total (Millions US $)	Petro aid as % of total ERP	Products as % of petro aid	ERP aid refineries (Millions US $)	Refining Capacity (1000 t)		
						Pre-war average	*1947*	*1 July 1949 – 30 June 1950*
France	2451,7	380,9	15,5	29,6	17,5	6255	5968	12025
U.K.	2838,1	331,1	11,7	88,5	9,7	2800	3384	7787
Italy	1349,1	143,6	10,6	32,8	8,1	1007	1232	3372
Benelux	1427,6	124,9	8,7	30,7		1002	1438	4369
Sweden	118,5	67,2	56,7	82,0		51	525	608
Denmark	258,9	56,2	21,7	100,0		40	31	33
W. Ger.	1298,5	54,6	4,2	23,4	0,7	2042	658	2213
Norway	237,8	36,1	15,2	98,8		10		
Greece	527,4	20,7	3,9	100,0				
Ireland	147,4	13,3	9,0	100,0				
Trieste	354,1	8,7	2,5	1,2				125
Portugal	51,2	8,6	16,8	61,9		200	267	295
Austria	561,4	3,6	0,6	100,0			350	513
Turkey	155,5	5,0	3,2	100,0				10
Iceland	23,8	1,4	5,9	100,0				
W. Europe	**11801,0**	**1255,9**	**10,6**	**63,7**	**36,0**	**13407**	**13853**	**31350**

Table 1: ERP aid, paid shipments of crude oil and petroleum products under the framework of the ERP, ERP funding for refineries and the evolution of refinery capacity. All data per country, 1948 to 1951. Sources: Painter, "The Marshall Plan and Oil", 166 (cf. note 12); Groen, "The Significance of the Marshall Plan", 93 (cf. note 29); MSA, *European Industrial Projects* (cf. note 46).

held at special accounts in the country's central bank.[47] By April 1953, the use of counterpart funds for refineries amounted to US $23 million, about as much as ECA/MSA funding.[48] Table 1 gives a detailed image of ERP aid, the share for petro-aid (i.e. funding to import crude oil and petroleum products), aid to enlarge refineries, and finally refinery capacity development from 1948 to 1950.

20 France, the U.K., Italy, and the Benelux region are similar in that they received the most ERP aid and also recorded the highest petro-aid distributions, which were between 8 and 15 % of total ERP aid received. Germany differs in that regard; although it received large sums from the ERP, the share of petro-aid was significantly lower at 4.2 %. All of these countries already had refining capacity in the interwar period. With the exception of the U.K., ERP dollars were primarily used to import crude oil. In the U.K., almost 90 % of imports were refined petroleum products. Given that the U.K. drew considerable portions from the Abadan and Haifa refineries, it is likely that the British utilized the ERP to compensate for their loss.[49]

In countries with little or no refining capacity, e.g., 21
Sweden, Denmark, Iceland, Ireland, Turkey and Greece, the share of refined petroleum product imports approached 100 %. Austria represented a special case. The country was in possession of crude oil fields and refineries; however, these were located in parts of the country occupied by the Soviets, which considered Austria's refineries and oil fields to be their property until the state treaty of 1955. The Soviets sold refined products to both COMECON and Austrian customers and considered profits as war reparations. Austria therefore received a low share of petro-aid, as 45 % of deliveries consisted of so-called hard petroleum products, e.g., petroleum coke used to replace coal in steel production plants.[50]

Four countries received ECA and MSA funding 22
to expand their refinery capacity. Eight refineries in France accounted for 48 % of this aid (17.5 million), two refineries in the U.K. for 27 % (9.7 million), four Italian refineries for 23 % (8.1 million), and one refinery in West Germany for 2 % (0.7 million). France benefited by far the most from participation in the ERP. Of

47 Armin Grünbacher, "Cold-War Economics: The Use of Marshall Plan Counterpart Funds in Germany, 1948–1960", *Central European History*, vol. 45, 2012, 697–716.

48 MSA, "European Industrial Projects", 14 (cf. note 46).

49 "Foreign Relations of the United States: Effects of Closing Down the Iranian Oil Industry", Office of the Historian, **history.state.gov**, 11/07/ 1951. **Url: https://history.state.gov/historicaldocuments/frus1951-54Iran/d39** (accessed 18/11/2022).

50 Walter M. Iber, "Erdöl statt Reparationen. Die Sowjetische Mineralölverwaltung (SMV) in Österreich 1945–1955," *Vierteljahrshefte für Zeitgeschichte*, vol. 57, n°4, 2009, 571-605.

13 refineries, eight received ERP funds. Around 42 % of these funds went to refineries owned by a French company (itself largely controlled by the State), and around 23 % each to refineries controlled by U.K. and U.S. companies.[51] This was in stark contrast to the British refining industry. In 1947, 13 refineries were in operation. Two of them were supported by the ERP. One was controlled by the Dutch Shell Refining & Marketing Co., the other by the Anglo-Iranian Oil Co.[52] While German refineries benefited less from ERP funds, the Allied politics nevertheless mattered to a great degree. In the "Bizone", the military administration of the US and the U.K. implemented a scheme in August 1947 to modernize refineries near Hamburg and to convert coal hydrogenation plants, that had been built by the Nazi regime to produce synthetic fuel, into oil refineries. This reconstruction of refining capacity also explains how the ERP petro-aid for Germany could finance mostly crude oil, rather than refined products.[53]

23 France, which received the largest funds, adapted the outdated infrastructure to market needs. Motorization had led to a demand shift from light products, e.g., kerosene for lightning and as aviation fuel, to heavier fractions, such as gasoline and diesel. Technically, this was made possible by new cracking processes, which increased the proportion of middle distillates. Until the 1930s, cracking was carried out exclusively on the principle of distillation. In the interwar period, catalytic cracking was brought to industrial scale.[54] The process allowed refineries to yield higher octane ratings in motor gasoline and a broader product range.[55] However, catalytic cracking was used only in U.S. refineries. By using ERP-funds, France installed catalytic cracking in five refineries and became a major exporter of refined petroleum products. In 1952, 44 % went to Algeria and about a quarter to Germany and Switzerland. Export shares to Western Europe increased enormously after Algeria's independence in 1962 and with the construction of transnational pipelines, while imports of petroleum products from the U.S. approached almost zero.[56] In that sense, even if the ERP refinery expansion program focused only on a few countries, it affected Western Europe more broadly in that it provided fuels for the whole region.

INSTITUTIONAL PETROCULTURE: THE OEEC TECHNICAL OIL COMMITTEE

This section deals with the OEEC as a "superstructure" that enabled the multilateral cooperation on oil issues in the Western hemisphere beyond the ERP years. First, the organizational set up is discussed, followed by an analysis of the role of the Technical Oil Committee (TOC) in coordinating responses to bottlenecks. 24

The Organizational Structure of the Technical Oil Committee

The OEEC council was made up of horizontal and vertical committees. The horizontal committees dealt with political economy issues, while the vertical committees were organized around core resources and commodities, such as iron and steel, machinery, textiles, chemical products, non-ferrous metals, timber, pulp and paper, food and agriculture, maritime and inland transport, electricity, coal, and oil. Although their activities were not associated with high level European policy in the public perception, they "formed the core of the OEEC's economic coordinating efforts", as Leimgruber and Schmelzer put it.[57] Staffed with technicians, civil servants 25

51 Groß *et al.*, "How the ERP", 268-284 (cf. note 8).

52 MSA, "European Industrial Projects", 41 (cf. note 46).

53 Rainer Karlsch, Raymond G. Stokes, *Faktor Öl: Die Mineralölwirtschaft in Deutschland 1859-1974* (München: C.H. Beck, 2003), 251-252; Boon, *Multinational Business and Transnational Regions*, 38-49 (cf. note 24).

54 Robert Ayres U., Ike Ezekoye, "Competition and Complementarity in Diffusion: The Case of Octane", *in* Nebojsa Nakićenović and Arnulf Grübler (eds.), *Diffusion of Technologies and Social Behavior* (Berlin: Springer, 1991) 433–450, here 439; Molle Willem, Wever Egbert, "Oil Refineries and Petrochemical Industries in Europe" *GeoJournal,* vol. 9, n°4, 1984, 421-430.

55 Alexander Klose, Benjamin Steininger, *Erdöl: ein Atlas der Petromoderne* (Berlin: Matthes & Seitz, 2020), 214-220.

56 Groß *et al.*, "How the ERP", 268-284 (cf. note 8).

57 Leimgruber, Schmelzer, "From the Marshall Plan to Global Governance", 31 (cf. note 6).

and industrialists, the Technical Committees provided a platform for knowledge exchange, the pan-European harmonization of national outlooks and policies in the areas of industrial development as well as coordinated transnational resource trade and a common energy policy.[58] After the ERP ended in 1952, the OEEC intensified its coordinative activities, and served as a specialized and largely autonomous intermediary organization that operated at various hierarchical levels without having to account for their actions to the electorate, elected politicians or representatives of the sector they regulated.[59]

26 As one of the most influential transnational organizations of its time, the OEEC sought to spread the paradigm of economic growth, and petroleum products were to be the fuel for this economic growth. This linkage between economic growth and a pervasive petroleum use constituted a specific "petroculture" in the sense of an arrangement of representations and meanings linked to oil in the TOC. In 1951, the OEEC had for the first time agreed on explicit economic growth targets. These were set at 5 % GDP growth/year for a five-year period, whereby the economy was expected to expand by a total of 25 % by 1956. It was expected that only such an expansion could ensure that the OEEC area would not face economic difficulties after the expiration of the financial assistance provided by the ERP, and guarantee social progress.[60] Sacha Gueronik, Head of Technical Services at the OEEC Secretariat, however, admitted that these figures had to be viewed in a differentiated manner. It could be assumed that industrial output would grow by 30 to 35 % by 1956; agriculture, however, only by 15 %.[61] With respect to Western European energy systems, the implemented growth paradigm created a dilemma, as the continent simply lacked the energy resources to fuel this growth.[62] Thus, one of the core functions of the TOC was to manage scarcity by means of international cooperation.

How the TOC Dealt with Bottlenecks

The expansion of the petroleum-based energy 27
system in Western Europe funded by the ERP resulted in tanker capacity shortages. In consequence, the study of bottlenecks became one of the core tasks of the OEEC Energy Committee and the TOC. Roughly one fifth of all crude oil imports to Western Europe still came from the Americas in the early 1950s.[63] When the increased year-round shipping of crude oil across the Atlantic overlapped with the seasonal transport of heating oil along the U.S. coasts, lack of tanker capacity caused rising freight costs for the Western European refinery industries. The OEEC counteracted this side effect with coordinated tanker building and tank farm projects. After the U.S. entered the Korean War in 1951, a steel shortage hampered the construction of storage and transport capacity, leading to a productivity push in the steel sector, with national economies channelling considerable ERP counterpart funds to the modernization of coal supply and steel production.[64] This allowed overcoming steel shortages, expanding the petroleum-based energy system[65], the proportions of human and animal work to be replaced by more efficient internal combustion engines,[66] and national economies to grow.

The importance of the TOC grew as petroleum 28
became a more and more central source of energy for national economies during the 1950s.[67] Within this upward trend, the 1956 Suez Crisis became a kind of "test case" for multilateral cooperation in the Western European petroleum

58 Ibid., 32-33.
59 Id.
60 OECD Archive, Paris. OEEC, Oil Committee, "Minutes of the 60th Meeting", 18 December 1951, 3.
61 Ibid., 4.
62 OEEC, *Some Aspects of the European Energy Problem. Suggestions for Collective Action* (Paris: OEEC Report 1955), 14.
63 OECD Archive, Paris. OEEC, Oil Committee, "Minutes of the 60th Meeting", 18 December 1951, 6-8.
64 Milward, *The Reconstruction*, 109 (cf. note 7).
65 OEEC, *Some Aspects of the European Energy Problem. Suggestions for Collective Action*, 14-15 (cf. note 62).
66 OEEC, *Second Report on Co-Ordination of Oil Refinery Expansion in the OEEC Countries* (Paris: OEEC, 1951); OEEC, *The Mechanization of Small Farms in European Countries: Report of the Agricultural Machinery Sub-Committee of the OEEC* (Paris: OEEC, 1951).
67 Türk, "The Oil Crisis", 211 (cf. note 14).

economy.[68] The crisis hit the refinery industry in Western Europe at a time when it imported nearly 70 % of its crude oil from the Middle East, and roughly 70 % of these deliveries via the Suez Canal.[69] After Egyptian President Gamal Abdel Nasser closed the canal in November 1956, Western Europe lost out on roughly 7 million t of crude oil a month. Two thirds of Western Europe's total supply now had to be transported either via the Cape of Good Hope or across the Atlantic. With crude oil now traveling much longer, a massive shortage of tanker capacity was soon on the horizon, which translated into temporary crude oil price surges of up to 350 %.[70]

29 Already in September 1956, the national envoys to the TOC had agreed to intensify coordination, avoid unilateral action, increase the mutual exchange of information and turn the committee into a body that would manage the distribution of crude oil supplies, if shortages were to occur.[71] To do so, it was necessary for individual countries to deliver detailed information about the state of their industries and the size of national oil reserves to be distributed. As the British chairman said, this required a fair amount of trust, since the governments were sharing strategically sensitive information with each other and the U.S. administration.[72] Country representatives agreed in November 1956 to recommend the procedure to their governments and curb petroleum consumption by shifting to coal, natural gas or electricity. In parallel, the TOC formed the OEEC Petroleum Emergency Group (OPEG) that acted as the counterpart to the U.S. Middle East Emergency Committee (MEEC).[73] That way, Western Europe's largest refiners were brought together with U.S. oil corporations to negotiate the scope and amount of crude oil deliveries.[74]

It soon became apparent that the situation in the 30
various countries was very different. In Germany, for example, petroleum products accounted for less than 10 % of total energy consumption, whereas in Greece they accounted for more than 80 %. Reducing consumption would therefore show very different effects. Thus, the principle of "allocation of available supplies between member countries" was applied, "so that the burden of the shortage would be shared on a fair and equitable basis."[75] In retrospect, the TOC rated this strategy a complete success. The TOC developed a mechanism that allowed 200,000 t of crude oil to be distributed every ten days, according to a distribution key jointly agreed by the member countries. Admittedly, a whole series of national differences of opinion had to be resolved in the course of allocation program. The amount turned out to be sufficient, not at least due to an exceptionally mild winter and economic activity leveling off.[76] Where shortages occurred, other oil suppliers stepped in, such as crude oil deliveries from COMECON to Germany, Austria, Italy and France.[77] Indirectly, therefore, the Suez Crisis also led to a revival of old trade links with Central and Eastern Europe. At the same time, the TOC decided for the first time to explicitly study natural gas, which until then had been rather neglected in the OEEC.[78]

The links that the TOC established between 31
economic growth, fossil fuels and international coordination again came to the fore in the late 1950s. Initially, Western European refineries had primarily been built and enlarged on the coasts of the Mediterranean, Atlantic and North Sea. From there, the refined products were transported to consumers by rail or road. During the 1960s, this transportation mode was replaced

68 OECD Archive, Paris. OEEC, Oil Committee, "Minutes of the 94th Meeting", 8 July 1957, 2.
69 OEEC, *Europe's Need for Oil: Implications of the Suez Crisis* (Paris: OEEC Report 1958), 11-13.
70 Ibid., 25.
71 OECD Archive, Paris. OEEC, Oil Committee, "Minutes of the 77th session", 1 October 1956, 13.
72 OECD Archive, Paris. OEEC, Oil Committee, "Minutes of the 78th session", 20 October 1956, 3.
73 Türk, "The Oil Crisis", 211 (cf. note 14).
74 OECD Archive, Paris. OEEC, Oil Committee, "Minutes of the 82nd session", 15 December 1956, 5.
75 OEEC, *Europe's Need*, 36 (cf. note 69).
76 Ibid., 33.
77 Ibid., 49-79.
78 OECD Archive, Paris. OEEC, Oil Committee, Record of the 92nd session, 2 and 3 May 1957, 6.

by pipelines that allowed to transport crude oil and semi-refined petroleum products to urban agglomerations and industrial clusters and process them in proximity to consumer centers.[79] The plans to build transnational pipelines, such as the Rotterdam-Rhine-Pipeline (opened 1960), the South European Pipeline (1962) or the Central European Line (1966) included the construction of considerable refinery capacity located close to consumers, in Germany, Switzerland, Austria, France and Belgium.[80]

32 Even though the pipelines were only realized over the course of the 1960s, it already became clear in 1958 that if all plans were implemented, a considerable surplus would be the result. Part of this surplus could be exported, while another part could be sold to novel outlets. At the same time, the TOC surveys showed that Western Europe would have to import roughly 16 million t of refined products in 1960, as not all products could be produced in Western Europe and new countries, e.g., the USSR, entered the market and provided cheaper products. The TOC could not stop such a development, but it could prepare the OEEC members for possible scenarios: If all refineries were operating at 90 % capacity, the surplus would be 25 million t, and a massive price drop would follow. If refineries were to reduce their production to 70-80 % of their maximal capacity, the surplus would be acceptable. In the medium term, however, the TOC argued that the OEEC region would have to boost overall economic growth and, by doing so, the consumption of refined products, otherwise the refinery industry would get into troubles.[81] In such an assessment, it becomes clear how the OEEC's petroculture combined two of the most influential paradigms of the second half of the 20th century: economic growth and pervasive oil use.

In sum, the described role of the OEEC and 33
of its TOC meant the emergence of a specific petroculture. This mattered because the TOC constituted an organization that allowed for the first time to coordinate national oil policies in peacetime. Until then, such cooperation had only occurred as temporary alliances during WWI and WWII.[82] When it came to discussions of refining capacity, national delegates to TOC functioned as feedback mechanism to governments at home.[83] In the early 1960s, they distributed among Western Europe governments the idea that an envisioned further expansion of refining capacity was justifiable as long as national economies were on a course of economic growth.

MATERIAL PERVASIVE PETROCULTURE: CONSUMERS OPTING FOR OIL OVER COAL

With the expansion of infrastructure and institu- 34
tionalized petroculture, the ERP and OEEC helped the spread of oil in Western Europe. In this section, the decline of coal related to the rise of petroleum products will be examined through the lens of railroads and shipping, residential heating and industrial production. By doing so, we integrate the perspective of the largest consumers into our analysis, which is crucial for an understanding of the energy transition to oil.

As mentioned, oil played a minor role in the 35
Western European energy system into the 1940s, but from the late 1940s and until the 1970s rapidly replaced coal as the dominant fuel. The data presented in Figure 2 demonstrates the rapid decline of the relative importance of coal. The share of coal in primary energy consumption declined from

79 Miriam A. Bader-Gassner, *Pipelineboom: Internationale Ölkonzerne Im Westdeutschen Wirtschaftswunder* (Baden-Baden: Nomos, 2014), 41-44.

80 Willem Molle, Egbert Wever, "Oil Refineries and Petrochemical Industries in Europe" *GeoJournal,* vol. 9, n°4, 1984, 421-430, here 425-426; Bader-Gassner, *Pipelineboom*, 32-33 (cf. note 79); Marten Boon, *Multinational Business and Transnational Regions* (cf. note 24).

81 OECD Archive, Paris. Oil Committee, Report to the Executive Committee on the likely implications by 1960 of the Development of Crude Oil Refining Capacity in Member Countries, Paris, 1 July 1959, 4-6.

82 Phil Johnstone, Caitriona McLeish, "World Wars and the Age of Oil: Exploring Directionality in Deep Energy Transitions", *Energy Research & Social Science*, n°69, 2020, 101732.

83 OECD Archive, Paris, Oil Committee, Report to the Executive Committee on the likely implications by 1960 of the Development of Crude Oil Refining Capacity in Member Countries, Paris, 1 July, 1959, 4-5.

over 80 % in 1950 to under 40 % in 1965, whereas the share of oil increased from 11% to 42 %. This change in the relative importance of coal and oil was linked to both new technologies and social practices, such as the increasing use of internal combustion engines in land transport, and to a decline of coal consumption. For the emergence of a European pervasive petroculture, both of these processes were necessary. While the ERP and TOC could change the circumstances decisively in favour of oil, it remained the decision of individual energy consumers to substitute coal with oil and thereby implement the transition.

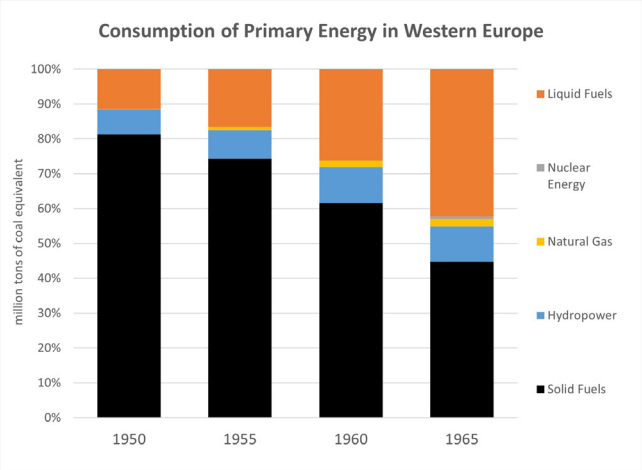

Figure 2: Consumption of Primary Energy in Western Europe. Source: Jensen Walter G., *Energy in Europe: 1945-1980* (London: Foulis, 1967), 117-121 (based on United Nations Statistics).

36 To be sure, the OEEC also had a coal committee. Although the OEEC coal committee has always been overshadowed by the European Coal and Steel Community (ECSC), its activities provide a good insight into the challenges faced by the coal sector since the increasing use of petroleum products. These can be summarized in three points: (1) competition from coal imports from both Poland and the US; (2) frequent structural difficulties like labour shortages and strikes but also stockpiling at mines due to limited demand; and (3) the competition from the alternative energy sources like hydropower, natural gas and fuel oil.[84] The coal committee therefore worked both in accordance but also in opposition to the TOC. Whereas both committees expected that coal and oil would be essential fuels for the reconstruction and growth of European economies, the coal committee grew increasingly concerned with the competition from fuel oils in traditional coal markets.

37 In 1956, all OEEC committees concerned with energy published a joint study of *Europe's Growing Need for Energy*. Regarding the demand for coal products, the report stated that coal consumption would continue to increase, prompting coal mines to increase their output. The expansion of the coal sector had been aided by the distribution of ERP-counterpart funds in Austria, Germany, Italy, France and the Netherlands. According to Alan Milward, the governments of these countries invested US $452 million or about one seventh of the total counterpart funds.[85] By 1956, due to the coal industries' prominence in the largest Western European national economies, there "was no doubt that given favourable conditions, coal could in time make a large contribution towards filling the energy gap."[86] Even though the oil committee vigorously promoted oil, there were no plans or expectations to close uneconomic coal mines or limit their capacity.[87] The situation changed with the European coal (stockpiling) crisis of 1957-1958. While Western European coal contributed to secure energy supplies during the Suez Crisis, the tide turned immediately after, into an oversupply crisis.[88]

Petroleum Products in the Transport Sector

38 The transport sector was a central driver of the transition from coal to oil and a profiteer of refinery capacity expansion in Western Europe. At the same time, the transport sector was also high on the list of priorities in the ERP. In virtually

84 OEEC, *The Coal Industry in Europe. Trends in Economic Sectors* (Paris: Organisation for European Economic Co-operation, 1954), 14-30.

85 Milward, *The Reconstruction*, 109 (cf. note 7).

86 OEEC, *Europe's Growing Needs of Energy: How Can They Be Met? A Report Prepared by a Group of Experts* (Paris: OEEC, 1956).

87 OEEC, *The Coal Industry in Europe. The Situation in 1958 and 1959 and Outlook on Future Trends: A Study by the Coal Committee* (Paris: Organisation for European Economic Co-Operation, 1960), 12-13.

88 OEEC, *The Coal Industry in Europe,* 12 (cf. note 86).

every participating country, the internal combustion engine industry received generous loans. FIAT benefited in Italy. In France, it was SIMCA, Citroën and the agricultural machinery manufacturer CIMA.[89] In Austria, the main beneficiaries were suppliers to the automotive industry and the tractor manufacturer Steyr-Daimler-Puch[90], and in the U.K., the carmaker Ford.[91] The expansion of capacity at these factories also boosted demand for refined petroleum products. As a side effect of the increased gasoline and kerosene production, the share of heavy fractions – diesel, distillate fuel and residual fuel oil – also increased and competed with predominant coal.

39 Not all uses of petroleum products, however, needed to replace pre-existing coal configurations. The widespread adoption of the internal combustion engine and the gas turbine, which became the dominant forms of transport by sea, land and air, did not replace a coal-fueled precursor directly. Still, the growing demand for refined gasoline and diesel products triggered a "widening" of the oil market. The necessity to also utilize the heavier fractions commercially provided an additional incentive to sell fuel oils to consumers like industries, heating, and thermal electricity production.[92] This process of widening was also reflected in other Technical OEEC Committees, e.g., the Committee for Agriculture, Inland and Maritime Transport or the Machinery Committee, which provided a forum for technical experts to present best practice examples of utilizing these petroleum products.[93]

In many sectors that mattered for this "widening" of the market, coal was the incumbent fuel, with pre-existing configurations of supply and consumption patterns as well as coal-based technological equipment. Those needed to be modified or replaced in order for industrial, commercial or residential consumers to shift to oil. Two of the early uses of fuel oil occurred in steam engines of ships and railways, which in the first half of the 20th C. were frequently retrofitted to burn oil instead of coal. 40

One of the best known use of oil-steam hybrids is the conversion of the British Royal Navy from coal to oil steamers during the First World War.[94] From the 1950s, however, diesel engines became the primary form of marine propulsion and steam ships gradually disappeared from European ports and shipyards.[95] In 1952, for example, 1074 new ships were launched, of which only 48, or less than 1 % of the total tonnage were designed to use coal as fuel.[96] Among the largest of the oil-fueled ships were oil tankers, which increased substantially in size in the post-war years as shipping magnates like Aristotle Onassis transformed the international oil shipping business to ship ever greater quantities of crude oil, above all from the Middle East to Europe.[97] While the world's oil tanker fleet had only consisted of ships under 100 t capacity in 1957, more than half of the world's tanker tonnage was larger than 100 t by 1970.[98] 41

In railway transportation, coal-fired steam locomotives were considered disadvantaged after WWII, because they needed to carry both coal and water. In order to increase their productivity, electric and diesel-powered forms of propulsion were discussed as part of the ERP. The OEEC 42

89 MSA, *European Industrial Projects: July 21, 1953* (Washington, D.C.: MSA Industry Division, Statistics and Report Division, 1953).

90 Franz Tinhof, *Zehn Jahre ERP in Österreich 1948–1958. Wirtschaftshilfe im Dienste der Völkerverständigung* (Wien: Verlag der Österreichischen Staatsdruckerei, 1958), 71.

91 MSA, *European Industrial Projects* (cf. note 89).

92 Kander *et al.*, *Power to the People*, 287-302 (cf. note 27).

93 OEEC, *The Mechanization of Small Farms in European Countries: Report of the Agricultural Machinery Subcommittee of the OEEC* (Paris: OEEC, 1951); *Mineralöl: Zur Umstellung von Industriedampfkesseln von Kohle- auf Ölförderung. Vereinigung Industrielle Kraftwirtschaft* (Essen, 1956).

94 Nuno Luís Madureira, "Oil in the Age of Steam," *Journal of Global History*, vol. 5, n°1, 2010, 75-94.

95 Melsted, Pallua, "The Historical Transition", 410 (cf. note 24).

96 UNECE, *Relationship between Coal and Black Oils in the West European Fuel Market* (Geneva: UN Economic Commission for Europe, 1954), 8.

97 Gelina Harlaftis, "The Onassis Global Shipping Business, 1920s-1950s", *The Business History Review*, vol. 88, no. 2, 2014, 241–71.

98 Gilbert Jenkins, *Oil Economists' Handbook* (London: Taylor & Francis, 1989), Table 18.2.

Inland Transport Committee organized several study tours for representatives of the Western European railroad industry to study the possibilities of a dieselization of railroads. After their return, the participants praised diesel-electric locomotives for their productivity, also because they did not require any complex infrastructure measures along the tracks.[99] In spite of this, the focus of the Western European railroad sector remained on electrification, which was a process that had been initiated well before the 1940s. Here the path dependencies on electric railways prevailed over dieselization arguments, also because it would have meant a potential standstill in the event of oil supply disruptions.[100]

Shifts in Residential Heating

43 The shift from steam to combustion engines was often seen as a logical upgrade to newer and more efficient technology. In the case of the heating sector, however, the competition and pushback of the coal industry was particularly forceful, as this was one of the most valuable retail markets for coal. In the 1950s and 1960s, coal was largely replaced by oil and by natural gas in certain areas, e.g. Germany and France, where almost all households had been heated with coal into the 1950s. By then, coal-fired central heating systems had spread widely. Shifting to oil increased comfort with automatization, as it meant no more coal shovelling and less (visible) pollution. In addition, heating oil offered significant savings in costs in the late 1950s.[101] This did not mean that coal suppliers and equipment producers let the valuable heating market go easily; in the late 1950s several improvements were made, such as mechanical devices to transport coal quickly and cleanly into storage bunkers and burners, or mechanical and less dusty solutions for ash disposal.[102] Despite those efforts, households and commercial buildings overwhelmingly switched to oil.[103]

One major reason for the shift was that oil companies strategically targeted residential fuel markets by selling oil at prices that were competitive with coal.[104] Oil suppliers had a higher flexibility in pricing than coal mines.[105] Indeed, the pricing of refined oil products varied substantially. Gasoline had little competition from other fuels. Thus, it could be sold at higher prices. However, the markets for heavy and light fuel oils were shaped by the competition with coal.[106] This can be seen from a comparison of the retail prices per energy content for light fuel oil (distillate fuel), anthracite coal and coke for residential uses in West Germany and France, which correlated with the growing consumption of oil products instead of coal (Figure 3). 44

Oil for heating became considerably cheaper per calorie in both France and Germany from 1957. In contrast, coal product prices remained stable. The increase of petroleum products on the Western European market due to the expansion of refinery capacities played a key role in the price development. As a result, fuel oil obtained a substantial price advantage in the heating fuel market. Falling energy costs for heating oil drove the pervasion of petroleum in Western European energy economies. 45

The Substitution of Coal in Industries

In the industrial sector, manufacturing plants in need of process heat, e.g. dairy processing, could easily switch between fuels. Other industries like glass or metal production needed to be adapted or upgraded to oil-burning technologies. Similar to indoor heating, there was a clear shift from coal to oil across industrial sectors.[107] This transition was supported by the ERP, from which considerable sums were channelled to manufacturers of industrial oil burner technologies, as the Austrian example shows.[108] The OEEC fostered 46

99 OEEC, *Railroads in the U.S.A. Report of a European Group of Experts* (Paris: OEEC, 1951).
100 Ibid., 31.
101 Melsted, Pallua, "The Historical Transition ", 411-412 (cf. note 24).
102 OEEC, *The Coal Industry in Europe*, 90-91 (cf. note 86).
103 Ibid., 22.
104 Alberto Clô, *Oil Economics and Policy* (New York: Springer, 2000), 88-91.
105 OEEC, *The Coal Industry in Europe*, 22 (cf. note 86).
106 Joy Dunkerley, Irving Hoch, "The Pricing of Transport Fuels", *Energy Policy*, vol 14, n°4, 1986, 307-317.
107 OEEC, *The Coal Industry in Europe*, 28 (cf. note 86).
108 Tinhof, *Zehn Jahre* (cf. note 90).

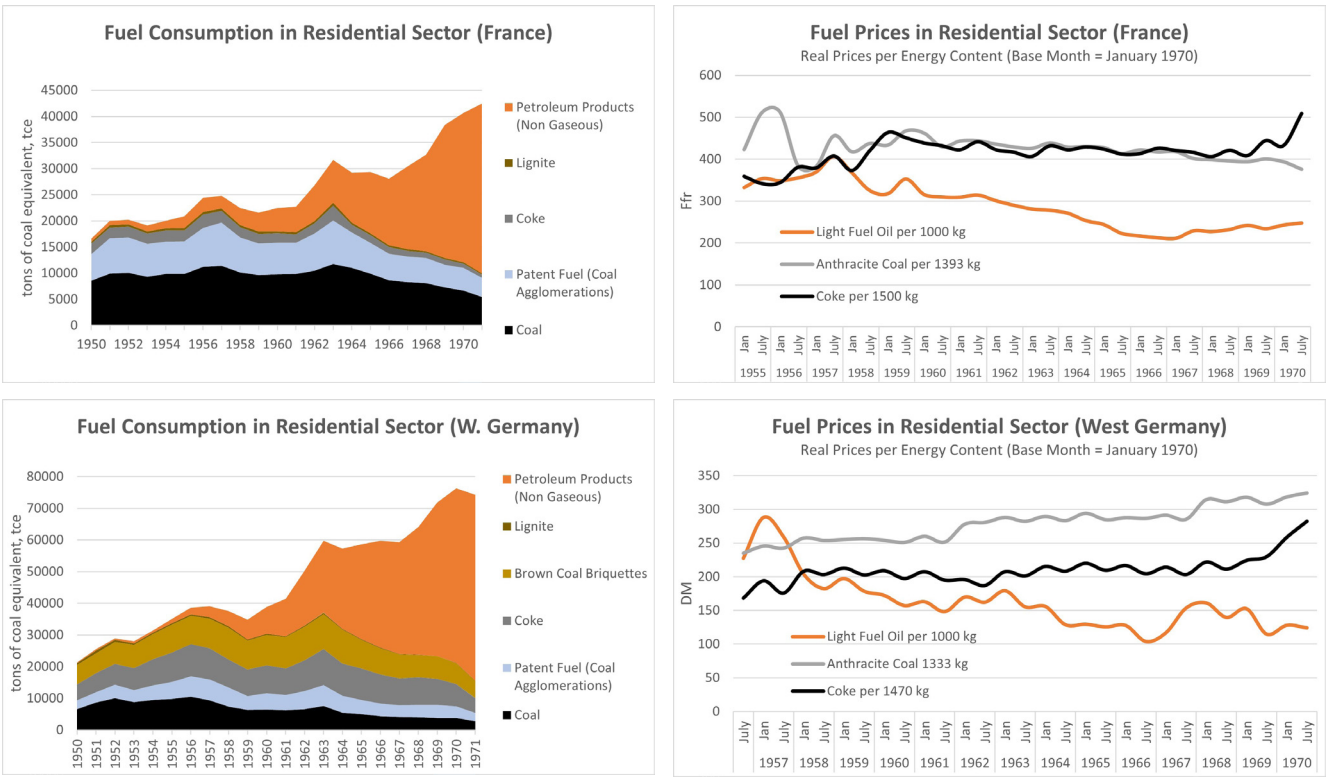

Figure 3: Consumption and Real Prices of Oil and Coal Products per Energy Content in France and West Germany (Residential Sector). Source: Statistical Office of the European Communities, *A Comparison of Fuel Prices 1955-1970* (Luxembourg: Eurostat, 1974).

the switch to petroleum products by providing a forum in which best practice examples of the energy transition in industrial companies were discussed.[109] Oil companies also aimed to capture industrial markets by selling especially fuel oil at prices competitive with coal.[110]

47 The economic incentive can again be traced in the exemplary comparison of industrial fuel prices per energy content in West Germany and France. In West Germany, the real cost of heavy (residual) fuel oil went considerably below that of soft coal and coke from 1957. In France, soft coal remained cheaper for industrial users until 1966. Then, heavy fuel oil became cheaper per energy content (Figure 4). As a result, coal was pushed aside from virtually all (lighter) industries. Given this economic framework conditions, even gasworks shifted from coal or coke to petroleum products and eventually to natural gas. The shift from coal to hydrocarbons as a feedstock also occurred in chemical industries.[111]

48 The exception to the rule were heavy industries like steel production and thermal electricity generation, which continued to rely on coal and coke. There was only limited competition in heavy industries, as they were optimized for coke as fuel. In thermal electricity generation, coal was partly replaced from the 1950s.[112] Particularly coal-importing countries like Denmark, France or Austria opted for fuel oil, whereas coal-producing countries continued to generate most thermal electricity from coal.[113] After the oil price crises of the 1970s, however,

109 *Mineralöl: Zur Umstellung* (cf. note 93).

110 Melsted, Pallua, "The Historical Transition", 416-418 (cf. note 24); Joy Dunkerley, "The Future of Coal in Western Europe," *Resource Policy*, vol. 4, n°3, 1978, 151-159, 154.

111 UNECE, *Relationship between Coal and Black Oils*, 15-16 (cf. note 96); Ronald S. Wishart, "Industrial Energy in Transition: A Petrochemical Perspective," *Science*, vol. 199, n°4329, 1978, 614-618; Raymond Stokes, *Opting for Oil: The Political Economy of Technological Change in the West German Chemical Industry, 1945-1961* (Cambridge: Cambridge University Press, 1994).

112 OEEC, *The Coal Industry in Europe*, 21 (cf. note 86).

113 UNECE, *Relationship between Coal and Black Oils*, 14 (cf. note 96).

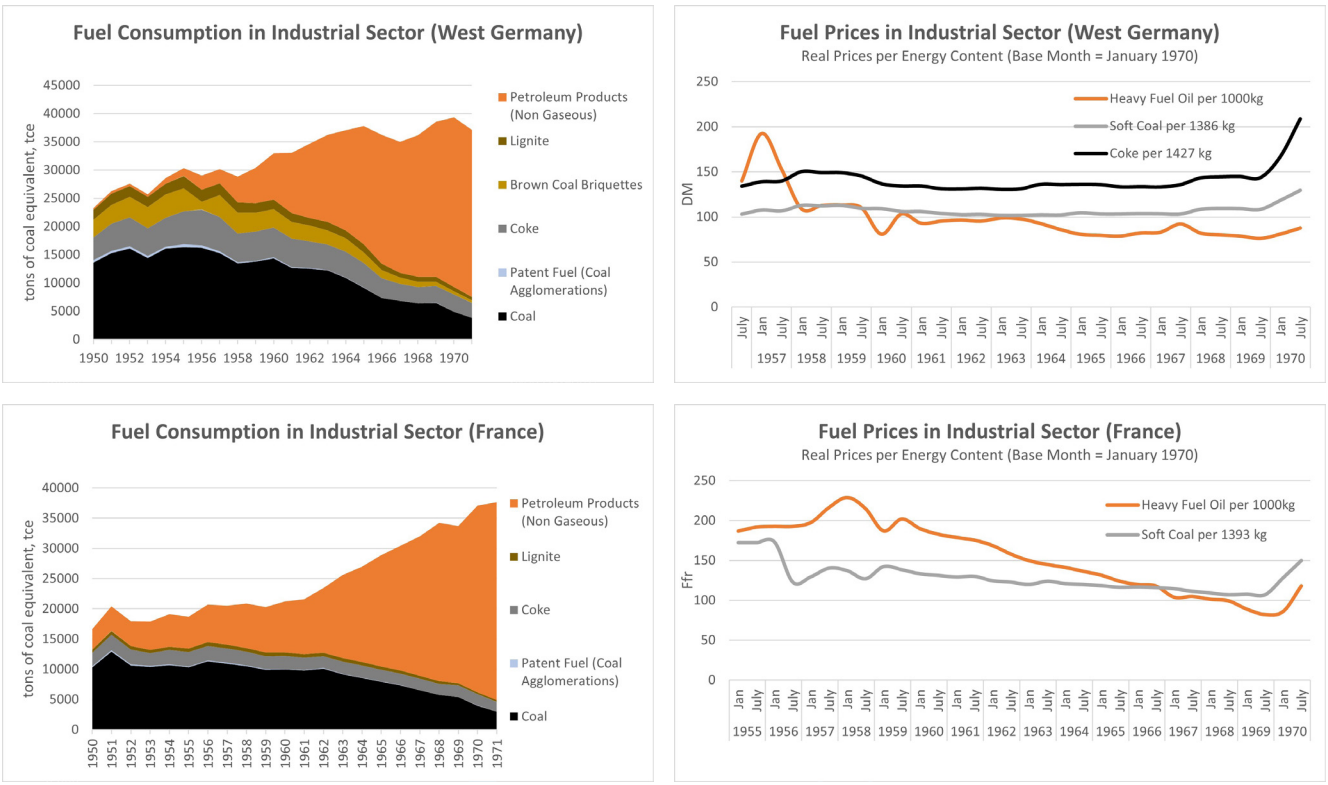

Figure 4: Consumption and Real Prices of Oil and Coal Products per Energy Content in France and West Germany (Industrial Sector). Source: Statistical Office of the European Communities, *A Comparison of Fuel Prices 1955-1970* (Luxembourg: Eurostat, 1974).

most oil power capacities shifted to alternative sources, including back to coal.[114]

49 In the end, both suppliers and consumers of energy helped created linkages that stabilized the oil configurations, fostering the use of oil for new applications like automobiles but also the substitution of established, coal-based energy uses with oil-based alternatives. As a result, the overall consumption of petroleum products in Western Europe increased from under 100 million ton per year in 1955 to over 600 million t/year by 1973.[115] The conditions for this development were provided by the ERP, OEEC and TOC. The result was a European pervasive petroculture, which has managed to endure a variety of challenges – ranging from the 1970s oil price crises to pollution and climate concerns – and persist to this very day.

CONCLUSIONS

How and why did oil become so pervasive in post-WWII Europe? The pervasiveness of oil cannot be grasped as the mere consequence of oil's physical properties, such as its abundance and its liquid state. When put into the context of the political economy of its time, its pervasiveness came about through entangled and mutually reinforcing processes that were as much political and cultural as they were technical and economic. To study these processes, we turned the analysis on the ERP and the OEEC's promotion of petroleum-based energy, such as dollar aid, technical assistance and particularly the European refinery expansion program. 50

Our investigation focused on three such processes. The first put Western Europe on a path towards greater oil use. The ERP influenced this in direct and indirect ways. Its major direct influence resided in financing one fourth of the oil imports to Western Europe between April 1948 and December 1951. More indirectly, it helped 51

114 Melsted, Pallua, "The Historical Transition", 418-420 (cf. note 24).

115 Jenkins, *Oil Economists' Handbook*, Table 7.30 (cf. note 98).

to modernize existing refineries and to build new ones to allow to process crude oil from the Middle East. While the ERP's financial contribution to the refinery expansion remained limited, and while its importance varied from country to country, the program mattered for the building of the necessary infrastructure. French refineries, for instance, which benefited the most from the ERP, installed catalytic cracking facilities and became major suppliers of petroleum products to other European countries. In addition, by channelling ERP funding to the combustion engine industry, a larger market for petroleum products was created during the reconstruction of Western Europe.

52 The second process we discussed was the growing cooperation between Western European countries brought about by the ERP through the foundation of the OEEC. The organization's technical committees, particularly the TOC, promoted economic growth based on an increase of energy consumption that was mainly to be fueled by oil. This specific link between growth and oil constituted an institutional petroculture that repeatedly mattered. For instance, in 1956, the technical oil committee's coordination helped to face the Suez Crisis. By avoiding a disruption of the growth of oil consumption, it contributed to keeping Europe on a path of an increasing pervasiveness of petroleum.

53 The third process consisted of consumers choosing to burn more oil. In some cases, they did so by relying on technologies where oil had little or no competition, e.g., through the use of motorized land transport by trucks, motor cars and motorcycles. In other cases, end-users opted to substitute coal with oil, for instance in maritime transport, residential heating, thermal electricity production and industrial applications. That way, petroleum could penetrate previously coal-dominated sectors. Focusing on the factors of such decisions to substitute coal might suggest that oil was mainly chosen because it was cheaper, offered advantages for the control of combustion and reduced visible pollution. Our study, however, put these factors in their wider political economy context.

That way, the entanglement and mutually rein- 54
forcing character of the three processes become clear. The initial supply of oil by the ERP and the expansion of refinery capacity made it a competitive alternative to coal. The institutional petroculture of the OEEC's technical committees allowed for technical exchange among the members countries and for cooperative management of scarcities and bottlenecks during the period under investigation. As for the matter of price, the increased output of refineries implied a greater amount of heavy oils, which companies started to market aggressively to compete with coal in space heating and industrial uses. In the 1950s, the resulting growth in demand changed the calculations of oil companies with regard to transport and refining, leading to the construction of pipelines and inland refineries, to the point that surplus and ensuing issues of rentability were feared. To address this fear, the TOC responded characteristically by advocating for more economic growth, which meant further increasing the use of oil products.

In sum, our examination of the ERP and the 55
transition from coal to oil shows that while the ERP was designed to secure democracy, peace, and economic growth, it created the conditions for a transition towards petroleum products, which pervaded all aspects of economic life. This pervasiveness not only increased productivity markedly. It created new path dependencies by linking virtually all spheres of life to flows of petroleum products and Western Europe as a macro-region to oil exporting regions all over the world. National governments and the OEEC first became aware of the detrimental side effects of this energy dependency during the Suez Crisis but have not been able to solve this dilemma to this day. The same applies to greenhouse gas emissions, another unintended side effect of the pervasiveness of oil and other fossil fuels in our everyday life. Both the current geopolitical energy crisis and the looming climate catastrophe can, therefore, in many ways be traced back to the attempts to escape the energy crisis of the late 1940s by the creation of a Western European pervasive petroculture.

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