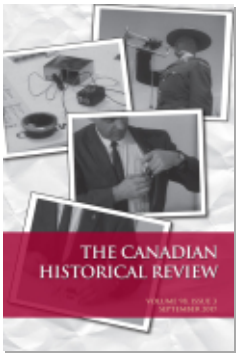
A Province Powered by Coal: The Renaissance of Coal Mining in Late Twentieth-Century Alberta



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A Province Powered by Coal: The Renaissance of Coal Mining in Late Twentieth-Century Alberta

Abstract: *This article examines the political economy of coal in the second half of the twentieth century, with particular attention to the resurgence of coal production beginning in the 1960s after a decline in the immediate post-war period. After 1962, the coal industry in Alberta was transformed compared to its early twentieth-century counterpart as it shifted from producing a transport fuel to producing a fuel for electric power generation and came to occupy a different place in Alberta's and Canada's energy networks. The shift to strip-mining in the post-war period, which was part of a global transition, enabled intensified exploitation of the resource at greatly reduced costs. A new coal industry in Alberta was born after 1962 that depended less on the labour of skilled coal miners than on the transferable skills of heavy equipment operators. A shift in markets for coal produced in Alberta fundamentally changed the place of coal in the provincial political economy. This article also contributes to the national and international energy literatures by presenting a case study of the mid-century energy transition in Alberta, complicating our understanding of which energy sources prevailed in this transition and why. While Alberta exported oil and gas, coal provided for the intensifying energy demands within the province itself. Coal was thus wholly integrated into the fossil fuel economy of the late twentieth century.*

Keywords: coal, strip-mining, electricity, energy history, energy transition, climate change, Alberta

Résumé : *Cet article traite de l'économie politique du charbon dans la seconde moitié du xxe siècle et accorde une attention particulière à la résurgence de la production de charbon à partir des années 1960, au lendemain d'un déclin dans l'immédiat après-guerre. Après 1962, l'industrie du charbon en Alberta passa de la production d'un combustible destiné aux transports à celle d'un combustible destiné à la production d'électricité, soit une transformation par rapport au début du xxe siècle. L'industrie en vint ainsi à occuper une place différente dans les réseaux d'énergie de l'Alberta et du Canada. Le passage à l'exploitation à ciel ouvert après la guerre, qui s'inscrivait dans une transition mondiale, permit d'intensifier l'exploitation de la ressource à des coûts nettement moindres. Une nouvelle industrie du charbon naquit en Alberta après 1962,*

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moins dépendante du travail de mineurs spécialisés que des compétences transférables d'opérateurs de machinerie lourde. La place du charbon dans l'économie politique de la province changea radicalement par suite de la réorientation des marchés du charbon extrait en Alberta. Cet article contribue aussi à la littérature nationale et internationale sur l'énergie en étudiant la transition énergétique en Alberta au milieu du siècle. Se dégage ainsi une image complexe de la nature des sources d'énergie prédominantes durant cette transition et des raisons justifiant cette prédominance. L'Alberta exportait certes du pétrole et du gaz, mais le charbon allait répondre à la demande accrue d'énergie à l'intérieur même de la province. Le charbon était donc complètement intégré à l'économie des combustibles fossiles de la fin du xxe siècle.

Mots clés : charbon, exploitation à ciel ouvert, électricité, histoire de l'énergie, transition énergétique, changement climatique, Alberta

In the fall of 2015, a few short months after their historic election to government, Alberta's New Democratic Party announced a climate-change strategy, which had as a central plank the phasing out of coal-fired electricity. The importance of the decision on coal was obscured by the strategy's other facets – the introduction of a carbon tax and a cap on oil sands' emissions – and the endorsement of the government's plan by environmentalists and industry.[1] Industry endorsements came from only one sector, however. Oil sands producers, Suncor and Canadian Natural Resources, attended the news conference alongside government officials. Unsurprisingly, the coal industry's lobbying arm – the Coal Association of Canada (CAC) – and the major coal operators in the province did not endorse the government measures. Indeed, the CAC, only a short time before, had appointed Robin Campbell as their new president.[2] Campbell was, until May 2015, the Progressive Conservative member of the legislative assembly for West Yellowhead, representing important coal-mining constituencies, and a former provincial finance minister and environment minister. Already facing a sustained decline in commodity prices and in the global demand for coal, the CAC and the industrial interests that it represented signalled that they

1 "Alberta's Climate Change Strategy Targets Carbon, Coal, Emissions," *CBC News*, 22 November 2015, http://www.cbc.ca/news/canada/edmonton/alberta-climate-change-newser-1.3330153 (accessed 24 May 2017).

2 This appointment provoked an ethics complaint from Progress Alberta that Robin Campbell had "violated the Conflict of Interest Act by becoming a lobbyist within a year of being a minister." Laura Osman, "Former Minister Robin Campbell Faces Ethics Complaint over Lobbying Efforts," *CBC News*, 6 April 2016, http://www.cbc.ca/news/canada/edmonton/former-minister-robin-campbell-faces-ethics-complaint-over-lobbying-efforts-1.3522472 (accessed 24 May 2017).

needed all the help they could get by appointing as president a prominent former politician with powerful connections.

In the months that followed the original government announcement, there was some public recognition of the significance of the phase-out of coal-fired thermal electricity in the province.[3] Intermittent news stories from coal communities, like Hanna and Grande Cache, highlighted an uncertain future.[4] In June 2016, the municipality of Grande Cache released a report questioning the community's viability given the need for renewed infrastructure in combination with the town's primary role as a service centre for the coal industry.[5] This article offers a historical perspective on the significance of phasing out coal-fired thermal electricity in Alberta by examining the political economy of coal in the second half of the twentieth century, the resurgence of coal production in the 1960s after a decline in the immediate post-war period, and the transformed character of the industry – from producing a transport fuel to producing a fuel for electric power generation – in comparison to its early twentieth-century counterpart. We contend that to effectively address the challenge of moving away from fossil fuels and to understand the loss that Albertans living in rural resource-dependent areas face as a necessary sacrifice to deal with the imminent threat of climate change, we need to direct attention to the importance of coal in Alberta's recent past.[6]

3 The significance had been recognized by long-standing opponents of coal, including the Pembina Institute and the Alberta Wilderness Association. For further discussion of the importance of twenty-first-century coal production in Alberta and beyond, see Tim Weis et al., *The High Costs of Cheap Power: Pollution from Coal-Fired Electricity in Canada* (Drayton Valley, AB: Pembina Institute, 2012); Lara Smandych, "Coal Mining on Caw Ridge: An Unwanted Legacy," *Wild Lands Advocate* 13, no. 3 (2005): 14–15.

4 "Hanna Fearful of 'Ghost Town' Future as Alberta Quits Coal," *CBC News*, 27 September 2016, http://www.cbc.ca/news/canada/edmonton/hanna-fearful-of-ghost-town-future-as-alberta-quits-coal-1.3780920 (accessed 24 May 2017).

5 "Town of Grande Cache Viability," Media release, 7 June 2016, https://grandecache.ca/images/PDF/mediareleaseviability.pdf (accessed 30 October 2016).

6 For more on our current energy transition, see the US Department of Energy's *Revolution Now, 2016: Annual Update on the State of Clean Energy Technologies*, September 2016, https://energy.gov/eere/downloads/revolutionnow-2016-update (accessed 24 May 2017); see also Arthur Nelsen, "Dutch Parliament Votes to Close Down Country's Coal Industry," *The Guardian*, 23 September 2016, https://www.theguardian.com/environment/2016/sep/23/dutch-parliament-votes-to-close-down-countrys-coal-industry/ (accessed 24 May 2017).

A.A. den Otter outlined the early history of coal mining, including the rise of the Coal Branch communities along the rail line between Edmonton and Jasper and the central significance of coal to settlement in Western Canada as a fuel for railways.[7] In a recent contribution to the history of coal in Canada, Andrew Watson noted that, in the years prior to the Great Depression, the railways consumed 40 to 50 per cent of the coal annually produced in Alberta and even more during the First World War.[8] The railway companies were the major employer in early twentieth-century Alberta, and the radicalism of Alberta coal miners, like their counterparts elsewhere in North America and Europe, has figured in studies of industrial conflict during this period.[9] Although his work is global in scope and does not specifically address Alberta, Timothy Mitchell's *Carbon Democracy* examines how flows of energy (whether coal, oil, or gas) have engineered political relations. In particular, Mitchell argues that the political power and radicalism of coal miners in the late nineteenth and early twentieth centuries arose from the character of coal mines – "unusually autonomous places and methods of work" – and the power of the miners to

7 A.A. den Otter, "A Social History of the Alberta Coal Branch" (MA thesis, University of Alberta, 1967); A.A. den Otter, "Railways and Alberta's Coal Problem, 1880-1960," in *Western Canada Past and Present*, edited by A.W. Rasporich (Calgary: University of Calgary, 1975), 84–98; A.A. den Otter, "Bondage of Steam: The CPR and Western Canadian Coal," in *The CPR West: The Iron Road and the Making of a Nation*, edited by Hugh A. Dempsey (Vancouver: Douglas and McIntyre, 1984), 191–208; A.A. den Otter, *Civilizing the West: The Galts and the Development of Western Canada* (Edmonton: University of Alberta Press, 1986); A.A. den Otter, *The Philosophy of Railways: The Transcontinental Railway Idea in British North America* (Toronto: University of Toronto Press, 1997).

8 Andrew Watson, "Coal in Canada," in *Powering Up Canada: A History of Power, Fuel, and Energy from 1600*, edited by R.W. Sandwell (Montreal and Kingston: McGill-Queen's University Press, 2016), 224.

9 Jim Selby, "One Step Forward: Alberta Workers, 1885–1914," in *Working People in Alberta: A History*, edited by Alvin Finkel et al. (Edmonton: Athabasca University Press, 2012), 39–75; Allen Seager, "Socialists and Workers: The Western Canadian Coal Miners, 1900–21," *Labour / Le Travail* 16 (1985): 23–59; Charles Allen Seager, "A Proletariat in Wild Rose Country: The Alberta Coal Miners, 1905–1945" (PhD dissertation, York University, 1982); David Jay Bercuson, *Alberta's Coal Industry 1919* (Calgary: Historical Society of Alberta, 1978); Allen Seager and David Roth, "British Columbia and the Mining West: A Ghost of a Chance," in *The Workers' Revolt in Canada 1917–1925*, edited by Craig Heron (Toronto: University of Toronto Press, 1998), 253, 261; Trevor E. Stace, "A Community in Conflict: The Crowsnest Pass 1932 Coal Strike" (MA thesis, University of Alberta, 2015).

potentially disrupt "every factory, office, home or means of transportation that depended on steam or electric power."[10]

Tom Langford has brought the history of labour activism in the coal fields into the post-war period, arguing that the severe contraction in the industry in the early 1950s left miners vulnerable to both employers and bureaucratizing, centralizing forces within District 18 of the United Mine Workers of America (UMWA). After 1945, thousands of coal-mining jobs were lost. Langford closes by noting that after 1955 "the UMWA would never again command the wholehearted allegiance of coal miners in Western Canada."[11] This suggestion, combined with the fact that his study ends before the resurgence of coal production in Alberta and British Columbia, equates the demise of coal miners with the demise of coal.[12] However, we suggest the relationship between labour and the industry was not so straightforward. The shift to surface mining in the post-war period, which was part of a global transition, enabled the intensified exploitation of the resource at greatly reduced costs and without having to contend with a radicalized and powerful labour movement. A new coal industry in Alberta was born after 1962 that depended less on the labour of skilled coal miners than on the transferable skills of heavy equipment operators and, through a shift in markets from railways to electrical energy, fundamentally changed the place of coal in the province's political economy.

The environmental history of the transition to surface mining for coal is important to the international literature on late twentieth-century coal mining, exemplified by Chad Montrie's *To Save the Land and People*.[13] Numerous studies before and since have focused on coal mining in Appalachia, particularly given the impacts that have occurred

10 Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London: Verso, 2011), 20–1; see also Thomas G. Andrews, *Killing for Coal: America's Deadliest Labor War* (Cambridge, MA: Harvard University Press, 2008) for a discussion of workscapes and militancy; Andreas Malm, *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming* (London: Verso, 2016), emphasizes the importance of steam power in offering superior control over subordinate labour.

11 Tom Langford, "Coal Miners' Resistance to Industrial Legality in Western Canada, 1940–1955," *Prairie Forum* 31, no. 2 (2006): 241.

12 Bruce Ramsey, *The Noble Cause: The Story of the United Mine Workers of America in Western Canada* (Calgary: District 18, United Mine Workers of America, 1990) does address the more recent history of the United Mine Workers of America in British Columbia and Alberta although only in one chapter titled "The Decline of Coal," which deals with the period from 1946 on.

13 Chad Montrie, *To Save the Land and People: A History of Opposition to Surface Coal Mining in Appalachia* (Chapel Hill: University of North Carolina Press, 2003).

in this region as a result of mountaintop removal for coal extraction since 1970.[14] Ian Urquhart's work on the controversial Cheviot mine project, just outside the eastern edge of Jasper National Park, offers preliminary analysis of populist opposition to surface mine development in Alberta in the 1990s, similar to the dynamics described by Montrie.[15] David Lake's thesis on landscape evolution in the Crowsnest Pass region from 1898 to 1971 presents some consideration of the scale of environmental change wrought by surface mining for coal in Alberta and British Columbia.[16] While these works inform our analysis, a fuller treatment of the environmental history of surface mining for coal in western Canada – the technological and environmental transition that enabled the renaissance in coal production – is beyond the scope of this article.

The political economy of resource development in western Canada is the most robust literature on which we draw. David Breen's comprehensive study of the Conservation Board, which at times governed coal production in Alberta, offers some insight into the relative importance of coal as compared to other fossil fuels in the history of provincial regulation up to 1960.[17] We foreground the place of coal in the province's post-war political economy, where coal is the fossil fuel that has received the least attention. Inattention to coal's growing importance in the late twentieth century is a theme within the energy historiography. As Christopher Jones writes, "an irony of the mineral energy regime is that higher levels of use are often correlated with lower levels of awareness."[18] To redirect attention to coal, we build

14 Shirley Stewart Burns, *Bringing Down the Mountains: The Impact of Mountaintop Removal on Southern West Virginia Communities* (Morgantown: West Virginia University Press, 2007); Peter A. Galuszka, *Thunder on the Mountain: Death at Massey and the Dirty Secrets behind Big Coal* (Morgantown: West Virginia University Press, 2012); Chad Montrie, "Bringing Down the Mountains: The Impact of Mountaintop Removal on Southern West Virginian Communities, 1970–2004," *West Virginia History* 2, no. 2 (2008): 125–7. Outside of Appalachia, see Cody Ferguson, "You Are Now Entering a 'National Sacrifice Area': The Energy Boom of the 1970s and the Radicalization of the Northern Plains," *Journal of the West* 53, no. 1 (2014): 69–78; Frank Uekoetter, "In the Shadow of Giant Mounds: Strip Mining in the Rhineland," *Icon: Journal of the International Committee for the History of Technology* 10 (2004): 110–22.

15 Ian Urquhart, "Cheviot: A Land Where Coal Is King," in *Assault on the Rockies: Environmental Controversies in Alberta*, edited by Ian Urquhart (Edmonton: Rowan Books, 1998), 81–124.

16 David W. Lake, "A Study of Landscape Evolution in the Crowsnest Pass Region, 1898–1971" (PhD dissertation, University of Oklahoma, 1972).

17 David Breen, *Alberta's Petroleum Industry and the Conservation Board* (Edmonton: University of Alberta Press, 1992).

18 Christopher F. Jones, *Routes of Power: Energy and Modern America* (Cambridge, MA: Harvard University Press, 2014), 227.

on the existing literature that has emphasized the provincial government's imperative to maximize the exploitation of fossil fuels, whether through the creation of the Alberta Research Council in 1921 (to encourage exploration and research on coal and oil sands) and the Oil and Gas Conservation Board in 1938 (which initially aimed to stem some of the losses in oil and gas that arose from unregulated production) or through Social Credit's later wholesale support of private enterprise in the oil patch in the post-war period and especially Ernest Manning's policy of "minimum interference with business," to demonstrate how the province ultimately chose to greatly increase coal production as part of an integrated resource exploitation strategy.[19] While oil, bitumen, and natural gas have shaped Alberta's place nationally, in international markets, and, most recently, on the world stage, coal's influence was greatest at home. By the end of the twentieth century, successive provincial governments relied on coal to power the province, while oil, bitumen, and natural gas were exported for profit.[20]

This article also contributes to the national and international energy literatures by presenting a case study of the mid-century energy transition in Alberta, complicating our understanding of which energy sources prevailed in this transition and why. Vaclav Smil notes that there are three "grand trends" apparent in twentieth-century global coal production: a continuous decline of the relative importance of coal, continuous growth in its absolute contribution to the primary energy supply, and the transformation from a highly labour-intensive industry to one that was highly mechanized.[21] These trends connect developments in Alberta with what was happening to the coal industry globally. As we demonstrate here, the first and third trend hold in the case of Alberta, where coal declined in relative importance compared especially to oil and natural gas and where we see the rise of mechanized surface mining after 1945. The second trend holds only if you compare 1945 to 2000. There was, however, a significant downturn in coal production from the 1950s to the early 1960s. If we turn our attention to

19 As cited in Alvin Finkel, *The Social Credit Phenomenon in Alberta* (Toronto: University of Toronto Press, 1989), 116. William Aberhart's Social Credit government showed greater antipathy to oil companies as exemplars of the big business interests that he opposed.

20 Paul A. Chastko, *Developing Alberta's Oil Sands: From Karl Clark to Kyoto* (Calgary: University of Calgary Press, 2004); G. Bruce Doern and Glen Toner, *The Politics of Energy: The Development and Implementation of the NEP* (Toronto: Methuen, 1985); Finkel, *Social Credit Phenomenon*.

21 Vaclav Smil, *Energy Transitions: Global and National Perspectives*, 2nd ed. (Santa Barbara: Praeger, 2017), 39–40.

the period from 1950 to 1962, then, we see an energy transition at work.

This is not the transition that is evident elsewhere in Canada and beyond, where coal declined in the face of the rise of natural gas and hydroelectricity and which is typically explained in reference to the material properties of each of these resources (namely that natural gas and hydroelectricity are cleaner burning and more easily handled and transported over long distances than coal). Within Canada, by focusing on the example of a province with control over resource development, we move away from explanations rooted in the materiality of energy resources to see how the national process did not simply replicate local or regional developments at a larger scale but, rather, involved different relationships predicated on distinct economic calculations and modified by local histories, geographies, and environments. The energy transition that occurred in Alberta in the 1950s was in the changing use of coal from transportation to electricity generation.[22] As we detail in this article, and building on the conclusions drawn by Jones, supply drove demand in this energy transition, there were at once overlapping and reinforcing energy transitions, and the state, private enterprise, and, to a lesser extent, labour each influenced the shape of the transition.[23] By taking a historical perspective, we see how choices made in the 1950s, 1960s, and 1970s influenced coal's new place in the provincial economy and, in turn, Alberta's place in national and international energy markets.[24] An alternate path, where coal was left in the ground, was resisted. Instead, the state and private enterprise erected a coal-based electricity infrastructure and created interdependence between different energy sources within Alberta and between provincial, national, and international markets that, in order for any future energy transition to occur, will have to be dismantled and alternative arrangements put in their place.

HISTORY OF POST-WAR PRODUCTION

Figure 1 pinpoints the 1947 Leduc oil strike against the backdrop of coal production between 1886 and 1962, graphically representing the

22 Ibid., ix, 23.

23 Jones, *Routes of Power*, 232–5.

24 While we do not argue that this is path dependency along the lines employed by Christopher Armstrong and H.V. Nelles in *Wilderness and Waterpower: How Banff National Park Became a Hydroelectric Storage Reservoir* (Calgary: University of Calgary Press, 2013), we do wish to emphasize the historical contingency involved in the continued rise of coal within the provincial economy.

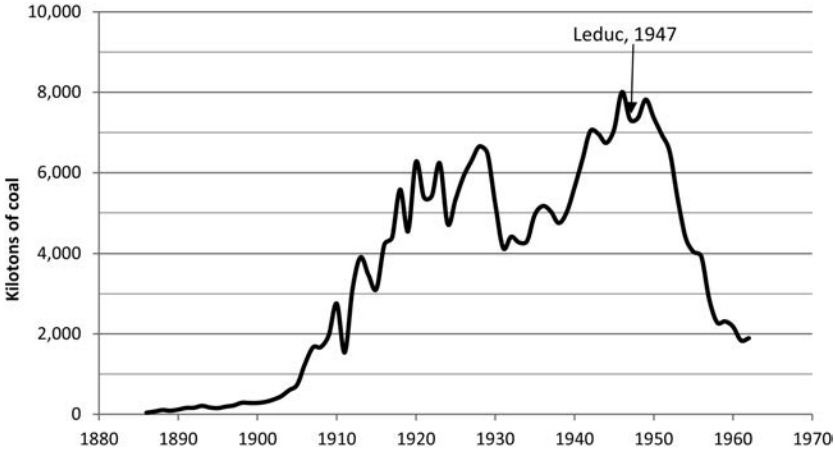

FIGURE 1 Coal production in metric kilotons, 1886–1962
Source: Data gathered from annual reports of the Alberta Mines Branch, the Alberta Mines Division, and the ERCB as well as from Alberta, Bureau of Statistics, *Facts and Figures* (Edmonton: Department of Industries and Labour, 1954).

most common narrative theme regarding Alberta's energy history and, specifically, the competing trajectories of coal versus oil. In this trajectory, Leduc stands as a signal of oil's rise and coal's concurrent demise. This theme can be found in most public and academic histories and was exemplified by the demise of the Coal Branch communities east of Edmonton, including those "bulldozed into nothingness" in the 1950s.[25] Prior to this point, and with the exception of the Great Depression, coal production in Alberta had grown steadily from the inception of the commercial industry in 1874. After 1949, coal production fell, reaching a nadir in 1962 that was equivalent to production in the early years of the industry (1909–11). Within the literature of resource development in Alberta, the widespread adoption of natural gas for domestic heating is presented as the culmination of a transition away from coal toward "cleaner," cheaper counterparts.[26] In their

25 Linda Goyette, "Lifelong Bonds to a Valley," *Edmonton Journal*, 7 June 1997, reprinted in Urquhart, *Assault on the Rockies*, 101.

26 Lorelei L. Hanson, "Changes in the Social Imaginings of the Landscape: The Management of Alberta's Rural Public Lands," in *Social Transformation in Rural Canada: Community, Cultures, and Collective Action*, edited by John R. Parkins and Maureen G. Reed (Vancouver: UBC Press, 2013), 155.

recent examination of the history of manufactured and natural gas, Colin Duncan and R.W. Sandwell emphasize the rapid adoption of natural gas across Canada in the late 1950s and its growing significance thereafter as a source of primary energy.[27] There was a national energy transition at mid-century that saw consumption of oil and natural gas, and, soon thereafter, hydroelectricity, grow absolutely and relative to coal consumption.[28]

The "crisis" in the coal industry dates to the war years.[29] Although demand for coal increased dramatically with the onset of the Second World War, the skilled labour pool – essential to underground coal mining – constricted sharply, with the secondary effect of driving up wages.[30] A major strike in 1943, connected to other labour actions across the continent, disrupted coal production, leading to shortages for the industry and in Alberta's urban centres, like Edmonton, where lights were dimmed to conserve electricity.[31] Prices for coal remained low at the behest of the Canadian National Railway (CN) and as part of wider wartime economic controls implemented by the Wartime Prices and Trade Board. Coal operators lobbied for assistance. With the creation of the Emergency Coal Production Board in 1942, the federal government established a subsidy system to cover operating losses "together with the amount of their standard profits or 15 cents per net ton of coal produced, whichever figure was lower."[32] When this subsidy was revoked in April 1944, a committee comprised of representatives of the Alberta government, the main provincial coal workers union, and industry sent an agitated brief to Prime Minister William

27 Colin A.M. Duncan and R.W. Sandwell, "Manufactured and Natural Gas," in Sandwell, *Powering Up Canada*, 300–1, see also plates 1.1 and 1.2 on energy consumption in Canada.

28 Richard W. Unger and John Thistle, *Energy Consumption in Canada in the 19th and 20th Centuries: A Statistical Outline* (Napoli: Consiglio Nazionale delle Ricerche, Instituto di Studi sulle Societa del Mediterraneo, 2013).

29 Brief of the Alberta Coal Committee Submitted to the Right Honourable W.L. Mackenzie King by Representatives of the Alberta Government, the United Mine Workers of America, District no. 18, and the Coal Operators of the Province of Alberta, 17 April 1944, file 3471, GR 1977.0237, Provincial Archives of Alberta (PAA) [ACC brief].

30 For an examination of the sharp increase in demand for power in general during the war period, see Matthew Evenden, *Allied Power: Mobilizing Hydro-Electricity during Canada's Second World War* (Toronto: University of Toronto Press, 2015).

31 Ibid., 160.

32 Michael D. Stevenson, *Canada's Greatest Wartime Muddle: National Selective Service and the Mobilization of Human Resources during World War II* (Montreal and Kingston: McGill-Queen's University Press, 2001), 92.

Lyon Mackenzie King and his cabinet. Bituminous mines (those producing the higher-grade coals used in the production of steel and as fuel for railways) had lost workdays due to insufficient orders and a lack of railway cars. The "Domestic coal mines" faced even more serious problems. These were the mines producing sub-bituminous or lower grade coals used in domestic heating, which, by 1944, "are averaging less than three days' work per week."[33] Some mines had closed, and their workers had been laid off. The Alberta Coal Committee, as it called itself, highlighted the problem that would be created if Alberta's mines could not keep their workers fully employed: miners would go elsewhere, and the mines themselves would not be able to ramp up production, when needed, without a skilled labour force ready at hand.[34]

However, the initial post-war economic landscape held promise for the coal industry. Demand continued strong while the restrictions on prices and labour lifted. Langford argued that western coal miners "emerged from the period of strict wartime regulation as defiant and militant as ever," their economic power intact.[35] As late as 1948, 11,000 coal miners from Alberta and British Columbia went on a ninety-six-day strike, protesting against contract work and demanding improved pay, securing a $2 pay raise.[36] There were several other smaller pit-head strikes that year. But a transition was underway, of

33 ACC brief.

34 This continued to be a problem into the 1950s when the deterioration of the industry through "lack of markets" appeared after 1949. One of the repeated lines of argumentation was basically about stranded assets – that coal would be left in the ground, even if it was needed in the future – where it would not be readily accessible because of the necessary investment and time lag in setting up the coal mines. See Letter from District 18 to Louis St Laurent and Members of the Cabinet, 22 November 1954, file 2826, GR 1977.0237, PAA; "General Conclusions and Recommendations," n.d., file 2826, GR 1977.0237, PAA. District 18 representatives would continue making such arguments into the 1960s and 1970s, emphasizing that miners were the backbone of Canada's energy economy but that if they could not find work underground they would take their skills elsewhere. See United Mine Workers of America, District 18 Brief to Standing Committee on Public Works and Natural Resources, presented by John H. Delaney, president, c. 1970–3, file 1999, GR 1977.0237, PAA.

35 Langford, "Coal Miners' Resistance," 234.

36 Benjamin Isitt, *Militant Minority: British Columbia Workers and the Rise of a New Left, 1948–1972* (Toronto: University of Toronto Press, 2011), 35. Langford describes it as a "no contract, no work" strike. Tom Langford, "An Alternate Vision of Community: Crowsnest Miners and Their Local Unions during the 1940s and 1950s," http://people.ucalgary.ca/~langford/world-apart.htm (accessed 24 May 2017).

which the 1947 oil discovery at Leduc was only a part. Most significant for the fortunes of the Alberta coal industry was the dieselization of the railways. Although CN and the Canadian Pacific Railway had experimented with diesel locomotives as early as 1929, it was not until the war that they began converting all of their engines to diesel, a process that was complete for both companies by 1960. In 1954, representatives from CN reported to a special federal government committee that their conversion to diesel was by that point irreversible. Donald Gordon, president of CN, observed that they were saving so much money that if they were asked to slow their conversion program in the interests of coal producers, "the Railway would expect to be reimbursed for the loss of these savings." Gordon further observed that, in any case, "such action would only postpone the loss of market to Canadian mines."[37]

The dieselization of the railways represented the most significant market contraction for the Alberta coal industry. In the words of den Otter, a "13,000,000-ton market had disappeared."[38] Following Mitchell's analysis, this transition significantly undermined the political power of coal miners – not only did they lose their jobs, but coal was also disconnected from the transportation network. In the first part of the twentieth century, coal was essential to the economic growth, specifically the movement of grain, that brought settlers and manufactured goods west. So tightly connected was this relationship that the production of coal exhibited a seasonality that rose and fell with grain production on the plains.[39] The dieselization of the railways severed this relationship and, with it, coal miners' control over a critical nexus within the emerging agricultural and industrial economy of western Canada.[40]

The dieselization of the railways was accompanied by the substitution of oil, gas, and hydroelectricity for coal across Canada. Urban centres in Alberta converted to natural gas for heating in the mid-1950s, although the conversion took much longer in rural areas, and, in general, the adoption of natural gas was both attenuated and more complicated than is often recognized. Natural gas first arrived in Edmonton, for instance, in 1923 via a 124-kilometre pipeline that was completed from Viking, Alberta, by the Northwest Utilities Company. This was ten years after a natural gas pipeline had reached Calgary.

37 "General Outline of Coal Situation," June 1954, 2, file 2826, GR 1977.0237, PAA.
38 Den Otter, "Railways and Alberta's Coal Problem," 97.
39 Ibid., 91, figure (Monthly Fluctuations in Coal Sales Mountain Park).
40 Mitchell, *Carbon Democracy*, 27.

Edmonton celebrated the arrival of natural gas with a ceremony featuring Mayor D.M. Duggan lighting a flare at the north end of the 105 Street Bridge (later known as the Walterdale Bridge) – a moment evoking similar urban celebrations of the arrival of electricity.[41] In 1923, 1900 Edmonton consumers (out of an urban population estimated at 60,000) were hooked up to natural gas for heating, lighting, and cooking, and local coal mines suffered from a decline in demand, with some closing down.[42]

Coal endured, nevertheless, through the mid-twentieth century. When Edmonton's major power generator, the Rossdale Power Plant, shifted to natural gas in 1955, it "wrote finis … to Edmonton's sixty-year-old coal industry," according to James MacGregor,[43] Yet, even this was only a part of a longer, ever-shifting relationship. While 79 per cent of Alberta households were connected to natural gas by the beginning of 1973, this included fewer than a quarter of rural Alberta homes. The provision of natural gas to Alberta farms was part of Peter Lougheed's Progressive Conservative 1971 election platform, and his government followed through with the creation of the Rural Gas Program to support the extension of natural gas throughout rural Alberta.[44] Nevertheless, and as is discussed in detail below, from as early as the 1960s, natural gas power plants were converted to coal-burning plants, demonstrating that when it came to the relationship between coal and other fossil fuels, there was no moment of wholesale transition but, rather, a series of shifts, back and forth, governed less by the superior qualities of either fuel than by the vicissitudes of economics and politics.

Alberta's domestic coal consumption was not the only concern. As Breen describes, coal companies in 1949 intervened in the debate over natural gas export because they were concerned that the transmission of natural gas to markets in Saskatchewan, Manitoba, and the Pacific Northwest "would displace Alberta coal and thereby cripple an industry

41 David E. Nye, *Electrifying America: Social Meanings of a New Technology, 1880–1940* (Cambridge, MA: MIT Press, 1990).

42 Estimated city population from municipal census, see City of Edmonton, "Population History," https://www.edmonton.ca/city_government/facts_figures/population-history.aspx (accessed 24 May 2017). By 1947, 41 per cent of Alberta homes had gas ranges, the highest proportion in Canada at that time. Cited in Duncan and Sandwell, "Manufactured and Natural Gas," 315.

43 James Grierson MacGregor, *Edmonton: A History*, 2nd ed. (Edmonton: Hurtig, 1975), 289.

44 Ibid., 231–2; John Schmidt, *Growing Up in the Oil Patch* (Toronto: Natural Heritage, 1989), 97; Federation of Alberta Gas Co-ops, "Federation History," http://www.fedgas.com/theme/common/page.cfm?i=11159 (accessed 24 May 2017).

that employed several thousand Albertans."[45] Breen observes that the transition to natural gas, and the successful development of national export markets on both sides of the Canada–US border, arose not only from the significant price advantage held by natural gas but also from the "obvious but important fact" that established and emerging oil and gas fields were, compared to coalfields, "much less likely to have to contend with the disruptions of a militant labour force."[46] The long-running tensions between coal workers and corporate interests served to highlight the significance of those moments when the two sides came together. Such was the case in 1944 with the short-lived Alberta Coal Committee and then again during the natural gas export debate, when the coal companies allied with labour interests, specifically the UMWA. Unfortunately, the alliance of coal interests was at odds with the Social Credit government of Alberta at the time, which supported natural gas exports, including even those members of the provincial government who represented the communities hardest hit by the collapsing coal market.[47]

STRIP AND SURFACE MINING

The oldest surface mine listed in the Alberta Energy Regulator's *Coal Mine Atlas* was a stripping pit dug in 1881 by the Hudson's Bay Company, which used coal for blacksmithing and heating, close to the banks of the North Saskatchewan River, just east of the present-day Windermere Golf and Country Club in Edmonton.[48] That one of the

45 Breen, *Alberta's Petroleum Industry*, 329. The construction of the TransCanada pipeline, which was started in 1956, was part of the larger debates around bringing natural gas from Alberta to wider markets. This pipeline displaced some western coal in Eastern and Central Canada but less than in the West. See "Trends in Canadian Coal Consumption," 20 July 1954, file 2826, GR 1977.0237, PAA.

46 Breen, *Alberta's Petroleum Industry*, 343; Mitchell, *Carbon Democracy*, ch. 1; Malm, *Fossil Capital*.

47 Finkel, *Social Credit Phenomenon*, 112. By contrast, Liberal and Co-operative Commonwealth Federation members of the provincial legislature opposed the large-scale sale of natural gas for export and called instead for its use within the province to encourage further industrialization (116).

48 The Alberta Energy Regulator (AER) maintains an online *Coal Mine Atlas* with comprehensive, information about all of the coal mines in Alberta, historical and operating. It was most recently updated in 2015 and includes production statistics up to 2014. AER, *Coal Mine Atlas*, https://www.aer.ca/data-and-publications/statistical-reports/st45 (accessed 24 May 2017). The atlas was first published by the AER's predecessor, the Energy Resources Conservation Board

earliest coal mines in the province was a surface operation is consistent within the longer history of coal where many of the earliest seams exploited were those most easily accessed at or near the earth's surface.[49] Beginning in 1907, coal was dug from stripping pits at the Tofield mine (east of Edmonton), which was amalgamated with the adjacent Dobell mine in 1912, and both were incorporated into the Headlight mine in 1930, which produced 2645 kilotons of coal before it closed in 1957, covering a surface area of just under one square kilometre.[50] The Dobell mine was the single largest surface operation before the Second World War, producing 402 kilotons of coal between 1912 and 1930. For many of the earliest surface operations, it is unknown whether any production for market ever took place. Where it did, surface mining initially involved the removal of the overburden (the soil and rock overlying the coal seams) with horse-drawn scrapers, which changed to steam and, ultimately, to diesel and electric-powered machines in later years. Nevertheless, sixty-six surface operations that began and ended before 1945 are known to have produced coal. Most were small operations, all but the Dobell mine produced less than 100 kilotons of coal, and, indeed, fifty-six of the sixty-six produced fewer than ten kilotons of coal. Compare this to the over 752 producing underground coal mines that opened and closed before 1945, which collectively mined over 70,000 kilotons of coal.[51] The production from the surface operations amounted to just over 1 per cent of the coal produced in all operations that ended by 1945.[52]

(ERCB) in 1985. The website includes the disclaimer: "It is probable that there are abandoned mines in the province that are currently unknown to the AER." Nevertheless, the quality of the data is exceptional and offers invaluable insight into the historical evolution of coal mining in Alberta. Given that coal prospects that never went into production were nevertheless assigned coal mine numbers, the atlas includes information on 2439 mines, of which only a fraction actually produced coal. The only disadvantage to the atlas for the purposes of this present study is that it does not show production over time – for instance, a mine that opened in 1911 but closed in 1998 will have all of its production in that time listed as a single entry. To deal with this uncertainty, we divided the atlas into mines that closed before 1945 and mines that closed after 1945. While some of the mines in the latter category also opened before 1945, this division facilitates the analysis of change over time.

49 Smil, *Energy Transitions*, 35.

50 Mine nos. 0150/1, 0340, and 0252. Surface area was 0.848 square kilometres. All production values in this article are calculated in metric tons (which are sometimes also referred to in other sources as tonnes). 1 kiloton = 1,000 metric tons. One metric ton = 1000 kilograms=1.10231 short tons (US) = 0.98421 long tons (UK).

51 Underground mining used conventional room-and-pillar methods.

52 These statistics are compiled from data in the AER, *Coal Mine Atlas*.

After 1945, the situation changed dramatically. For operations that closed after 1945 – 756 in total, 442 that produced at least 1 kiloton of coal – the split between underground and surface operations was much closer: 217 producing surface operations to 225 producing underground operations. And in terms of the thousands of tons mined in the period up to 2014, surface operations produced 1,302,797 kilotons of coal compared to 222,923 kilotons from underground operations (or almost six times as much coal came from surface operations). There are other ways to consider this transformation. Figure 2 shows the shifting geography of operations and their concentration in the area west of Edmonton in the post-war period. Where there had been 168 underground mines and thirty-six stripping pits in 1943, in 1971, the operators produced more coal, but now there were only twenty-seven mines total, five of which were underground and the other twenty-two were surface strip mines. The concentration of operations into fewer and fewer mines, with most of the activity taking place at the earth's surface, while steadily increasing overall production, continued into the twenty-first century. Coal production in 1943 amounted to 6965 kilotons. By 2008, thirteen mines (all of which had surface-stripping operations, though one also had an underground mine), produced 37,890 kilotons of coal, over five times the annual production at mid-century.[53]

Surface-mining methods in Alberta varied between the plains and the foothills and mountains. Area stripping was used on the plains, whereby a trench was cut to expose the coal seam and the overburden placed to one side. Once the coal was extracted, an adjacent parallel trench would be cut, and the overburden in this instance would be used to fill in the original trench. In the foothills and mountains, companies used open-pit mining (the steep pitch of many coal seams and variable topography meant that contour strip-mining used in the Appalachians was not possible).[54] With open pits, the overburden was disposed outside of the mining area – often "dumped onto the side of the hill."[55] The form of open-pit mining varied depending on both the geology of the seam and the topography of the area, with some sites

53 These data are drawn from annual reports of the Alberta Mines Branch, the Alberta Mines Division, and the Energy Resources Conservation Board.

54 For more on the character of strip-mining in the United States and globally, see Montrie, *To Save the Land and People*, ch. 1.

55 This section draws principally on the description of surface mining provided in Environment Conservation Authority, *The Impact on the Environment of Surface Mining in Alberta: Proceedings of the Public Hearings*, part 1 (Edmonton: Environment Conservation Authority, 1972), 14.

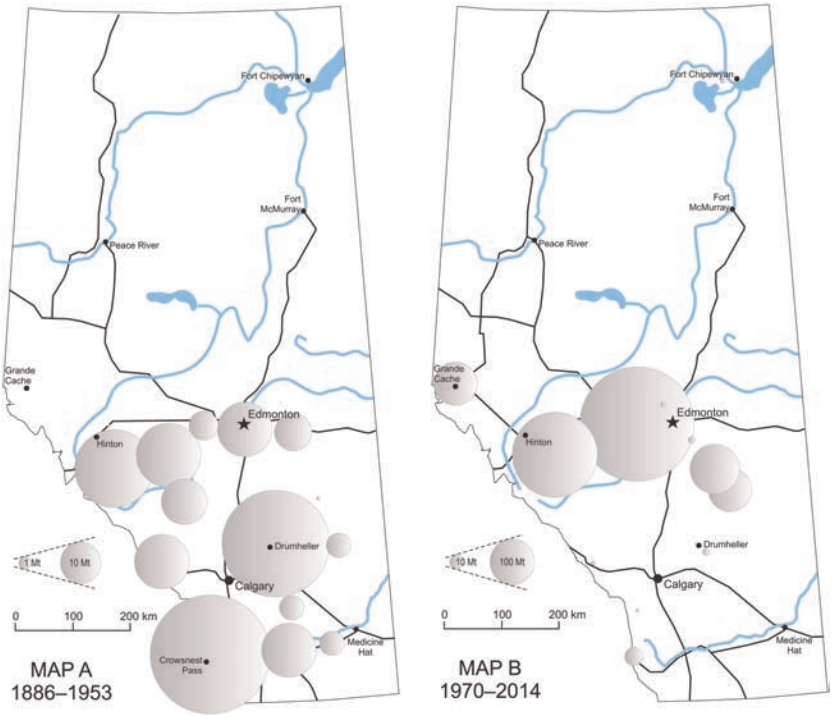

FIGURE 2 Relative coal production by region, 1886–1953 (Map A) and 1970–2014 (Map B). The areas of the circles are proportional to the tonnages produced. Note the change of scale from Map A to Map B.
Source: Map A was adapted from Chart 36 in Alberta, Bureau of Statistics, *Facts and Figures* (Edmonton: Department of Industries and Labour, 1954), III. Map B was created using data from AER, *Coal Mine Atlas*, https://www.aer.ca/data-and-publications/statistical-reports/st45 (accessed 24 May 2017).

characterized by a series of benches and high walls, while others had large pits.[56]

Figures 3a, 3b, and 3c illustrate some of the trends characterizing the Alberta coal industry over the course of the twentieth century and, in particular, the changing role of underground and surface operations before and after the Second World War. This figure shows the numbers of underground and surface mines that either opened or closed in

56 Unless otherwise specified, we use the term "surface mining" to encompass all of these different methods.

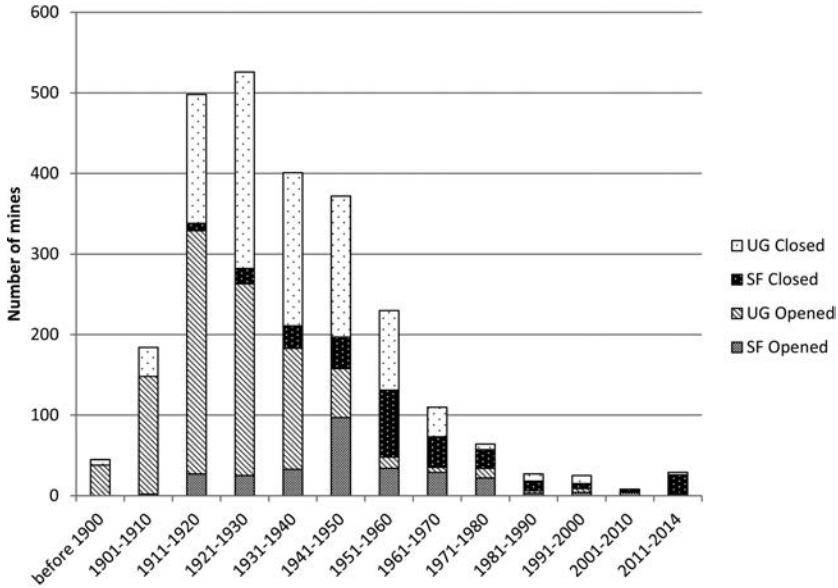

FIGURE 3A Underground (UG) and surface (SF) operations that opened and closed in each decade from 1900 to 2014
Source: Data for all three figures were drawn from AER, *Coal Mine Atlas*, https://www.aer.ca/data-and-publications/statistical-reports/st45 (accessed 24 May 2017).

each decade. In combination with calculating the average lifespan of mines that closed in any decade, some important dynamics of the coal industry's history are revealed. Foremost, we see the consolidation of operations over time.[57] Even as coal production grew, the number of operations shrank, dramatically so by the end of the twentieth century. The turn toward surface mining is also illustrated clearly here with the number of surface operations opened overtaking underground operations opened in the 1940s, a relationship that has persisted ever since. Significant numbers of underground mines closed in the 1930s through the 1960s. The closures in the 1930s and 1940s can be attributed to the challenges that came, first, as a result of the Great Depression and, later,

57 Consolidation was considered, by the ERCB in the 1970s, as industrial progress. The board bemoaned the "fragmented industrial organization" and "inherent instability" represented by the numerous small operators in the pre-1945 period, which it argued had "greatly weakened the industry." ERCB, *Review of the Alberta Coal Industry 1973*, ERCB Report 74-E (Calgary: ERCB, March 1974), 2–6.

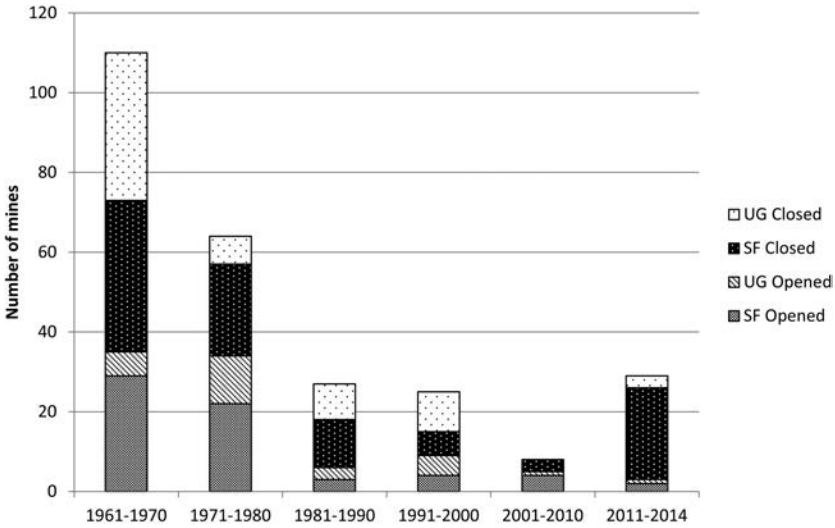

FIGURE 3B Detail of the 1961–2014 period

as a result of the wartime emergency. While fewer underground mines overall closed in the 1950s and 1960s, these were on average older mines. Mines do have a lifecycle, and the twenty- to thirty-year average age of underground operations that closed in this period might reflect this cycle, but it also reinforces the fact that many underground operations were being replaced by surface mines.[58]

The expansion of surface mining in the post-war period arose out of several interconnected factors. Both world wars drove increased demand for coal and helped make strip-mining "more respectable" to provincial politicians and coal mine operators, although there were lingering concerns expressed in some quarters about the quality of strip-mined coal.[59] More significantly, the Second World War drove technological advancements in, and increased production of, the heavy equipment used in strip-mining. When these machines became available on commercial markets after the war, they contributed to the

58 Homer Aschmann, "The Natural History of a Mine," *Economic Geography* 46, no. 2 (1970): 172–89.

59 Burns, *Bringing Down the Mountains*, 12. Concerns about quality are discussed in N. Allen Maydonik, *The Luscar Story* (Edmonton: Luscar Coal, 1985), 82; Galuszka, *Thunder on the Mountain*, 90.

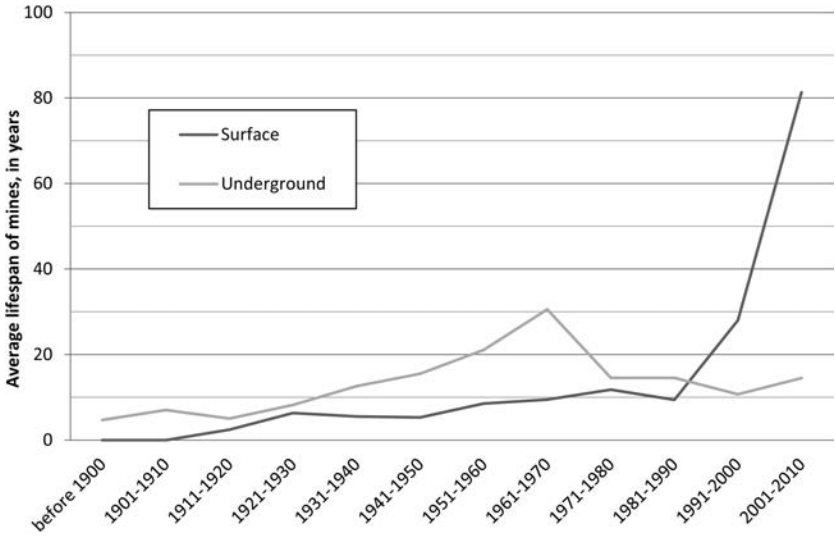

FIGURE 3C Average lifespan (years open) of underground mines (UG, in light grey) and surface mines (SF, in dark grey), organized by the decade in which the mine closed.

steady and rapid expansion of strip-mining in Alberta.[60] The technology deployed in surface coal mines is among the largest ever constructed, and Keith Haddock describes stripping shovels as the "true giants of the machine world" (see Figure 4a).[61] These shovels worked by digging long strips or cuts and moving the material they dug into the adjacent cut that has already been mined.[62] The shovels increased dramatically in size during the 1960s. Walking draglines, a type of excavator, are more flexible than stripping shovels in terms of how much overburden

60 R.G.H. Cormack, "A Study of Strip Mine Areas in Alberta, Part I: Mountain and Foothill Regions," unpublished report (1950), 2. The study was commissioned by the Department of Lands and Forests. This is also an example of technological momentum driving adoption of surface mining technologies within the larger North American coal industry. For more, see Thomas P. Hughes, "Technological Momentum," in *Does Technology Drive History?: The Dilemma of Technological Determinism*, edited by Merritt Roe Smith and Leo Marx (Cambridge, MA: MIT Press, 1994), 101–13; Thomas P. Hughes, *Networks of Power, Electrification in Western Society, 1880–1930* (Baltimore: Johns Hopkins University Press, 1983).

61 Keith Haddock, *Giant Earthmovers: An Illustrated History* (Osceola, WI: MBI Publishing Company, 1998), 139.

62 Haddock describes this process as similar to plowing a field, "where the furrow being cut is turned over into the adjacent furrow." Ibid., 139.

FIGURE 4A Bucyrus-Erie 200-B electrically operated stripping shovel. One of the smallest stripping shovels built. Used at the Roselyn Mine near Hanna, Alberta. It is now preserved at the Reynolds-Alberta Museum in Wetaskiwin, Alberta. The adult in the forefront is for scale.
Source: Author, 2016.

they can move. Bucyrus-Erie, a US company and major producer of surface and underground mining equipment, was founded in the 1880s. They produced the first steam-powered draglines, some of which were still used in Alberta during the 1950s (see Figure 4b). However, it was diesel and electric-powered earthmovers, many of which were surplus machines produced for the war effort, which transformed coal mining. These proliferated in Albertan and North American mining operations after 1945 and facilitated the move from underground to surface mining. By the 1950s, the "overall lower cost of operating diesel equipment" destroyed the principal market for Alberta coal in its transformation of the rail industry, buried the historic Coal Branch towns (figuratively and literally), and provided new tools for coal extraction.[63]

63 "Coleman Collieries Limited: Fourth Annual Report," ending 30 June 1956 for 12 Months, Directors' report, file 2823, GR 1977.0237, PAA.

FIGURE 4B Bucyrus Class 24, the world's oldest known dragline, built between 1911 and 1929. It was last used in 1958, southwest of Hinton. It is now preserved at the Reynolds-Alberta Museum in Wetaskiwin, Alberta. There is a five-year-old in front for scale.
Source: Author, 2016.

Strip-mining appealed to producers because it permitted faster and cheaper coal production, with fewer accidents and casualties. The capital cost of investing in a stripping shovel or dragline was minimal given that the equipment could last for thirty years or more, and many Alberta operators purchased the equipment second-hand from the United States, further lowering their initial costs. In Alberta, motivation to shift to surface production also lay with the continued low prices for coal, combined with high operating costs fuelled by a continued shortage of skilled underground labour.[64] In the *Luscar Story*, an official company history published in 1985, the author notes: "In an attempt to reduce mining costs, Sir Harold decided that both mines should adopt a technique new to the operations and try open-pit or surface strip-mining."[65] That skilled underground labour represented

64 Prices for coal were low across North American markets in this period. Galuszka, *Thunder on the Mountain*, 92.
65 Maydonik, *Luscar Story*, 78.

the most significant contributor to this dilemma was specified in a letter to the Coal Operators' Association of Western Canada from Luscar Coal's general manager in 1954.[66] Surface mining did not even require skilled coal miners but, rather, heavy equipment operators. In the Appalachians, where strip-mining also expanded significantly in this period, the new workers hired in West Virginia had experience with highway construction, not coal mining.[67] Strip-mining offered a means of extraction that circumvented relatively scarce, expensive, skilled miners and, by extension, their powerful unions.

District 18 of the UMWA was determined to recruit strip miners to join the union. Mike Susnar, who was later the district president from 1968 to 1970, led a recruitment campaign, visiting various strip operations across Alberta between 1959 and 1963. This campaign met with little success; mine workers in Taber, Eyermore, Canmore, Wabamun, and the foothills had very little interest in unionizing. The most common reasons workers provided for their lack of interest in joining the UMWA centred on their lack of previous union experience and the nature of strip-mine operations. Most of these mines employed, on average, only fifteen to twenty men at once (the Taber stripping pit employed as few as six men in 1963), and the operation was seasonal. For some of these individuals, strip-mining was not their only means of employment. While Susnar was largely ineffective in unionizing Alberta strip miners under the UMWA, he did influence the workers at the Wabamun operation to form their own local union, the Alberta Strip Miners' Union (Local 1595) through a direct charter with the Canadian Labour Congress. Local 1595 came to an agreement concerning work hours with Alberta Coal of Wabamun in 1961. Before this agreement, Wabamun workers received only four-hour shifts and some were only given two days of work per week.[68] The 1961 agreement includes articles ensuring five eight-hour shifts per week for each strip-mine worker. Nevertheless, in forming their own union, rather than signing up with the UMWA, despite Susnar's organizing efforts, strip miners signalled how their work diverged from that of their underground predecessors. Other strip-mine workers would organize in company associations or through locals of the International Union of

66 D.B. Young, General Manager, Luscar Coals Ltd to W.C. Whittaker, Managing Director, Coal Operators' Association of Western Canada, 4 October 1954, file 2826, GR 1977.0237, PAA.

67 Burns, *Bringing Down the Mountains*, 12.

68 M.P. Susnar, "Memorandum Re: Wabumun," June 1962, United Mine Workers of America, District 18 fonds, M-6000–288, Glenbow Museum Archives (GMA).

Operating Engineers or the United Steelworkers.[69] Companies preferred these unions because, in general, they were willing to accept cheaper wages and benefits and, in particular, because it saved them having to pay the hard-won Welfare Fund assessment that amounted to 27 cents per ton compared to contracts with the UMWA. Edward Boyd, District 18 president from 1958 to 1963, described the strip mines in Alberta as "mortally scared" of this assessment, "in regard to their large man per day production."[70]

The depression in the coal industry that took hold in the 1950s encouraged the transition to strip-mining. Low prices, the continued loss of markets, and the focus of development and exploration efforts on oil and gas prospects meant that many underground operations simply closed up, while others reduced operations or went into extended periods of inactivity. The annual reports from the early 1950s of Coleman Collieries, which had significant underground operations and some surface mines in the Crowsnest Pass region, tell a protracted tale of industrial woe. In April 1954, the company reported sales down 23 percent compared to the previous year and "an accelerated rate of decline [in the first three months] as compared to the same period in 1953."[71] The downhill slide continued into the late 1950s, and prospects were grim as "it would appear that the sales of coal to the railways will have practically ceased by the year 1961, and that sales of coal will from thereon be dependent upon the industrial market."[72] Coleman Collieries constructed briquetting operations to increase their output of metallurgical coal, changed their financial reporting year, and initiated corporate reorganization for, "in the face of the continuing decline in the market for bituminous coal, it would be impossible for the Company to maintain full service on its original bond issue."[73] The biggest change in Coleman's operations came in 1956 when the directors decided to enter into the general construction business, including the construction of highways, concrete bridges, and steel structures. This path for diversification made sense because of the capital investments that Coleman had already made into earth-moving equipment for their surface operations. They only needed to redirect the use of this equipment toward different ends. It also

69 Ramsey, *Noble Cause*, 192.
70 Cited in ibid., 191.
71 "Coleman Collieries Limited: Second Annual Report," ending 31 December 1953 for 12 Months, Directors report, 7 April 1954, file 2823, GR 1977.0237, PAA.
72 "Coleman Collieries Limited: Fourth Annual Report."
73 "Coleman Collieries Limited: Third Annual Report," ending 30 June 1955 for 18 Months, Directors report, 5 July 1955, file 2823, GR 1977.0237, PAA.

signals how, as in West Virginia, the previously highly skilled labour of coal miners was being transformed into the general skills of heavy equipment operators. Luscar Coal, another major operator in the Alberta coalfields, took a different path toward diversification, by investing in oil.

FROM AN "EMERGENCY" SITUATION TO NEW OPPORTUNITIES[74]

Luscar Coal, in many respects, was the exception. It was one of the largest operators in Alberta and was able to adapt to the changing circumstances of the immediate post-war period through diversification and a wholesale shift to surface mining. The many smaller and mid-sized operators in the Alberta coalfields at mid-century that provided jobs to the thousands of families who lived in coal communities in the west had less capital and revenue with which to adapt. This was an issue primarily of corporate adaptability rather than resource character, as many of the leases held by these smaller operations were later incorporated into strip operations.[75] The dismal prospects facing these companies and communities in the mid-1950s pushed both the provincial and federal government to take action in support of the coal industry.

In Alberta, the Social Credit government under the leadership of Ernest Manning took direct steps in support of both workers and coal lease owners. The provincial Coal Miners Rehabilitation Act provided funds to help coal workers with the transportation costs involved in getting to their new jobs; however, it did little to help those who were simply out of work.[76] A month later, Manning signed an Order in Council reducing rent payments by 75 per cent for five years on coal lands held by companies that had suspended operations. The order

74 Dr Berkowitz, "Suggestions for Canadian Coal Policy," n.d., file 2826, GR 1977.0237, PAA. Berkowitz described the situation in Alberta specifically as an "emergency."

75 See AER, *Coal Mine Atlas* for overlaps. See also Maydonik, *Luscar Story*, 111, where there is an excellent example of how strip operations reworked lands previously exploited by underground mining: "In 1976 ... new excavations uncovered the underground fire which had forced Colonel Alexander Mitchell to close off the seam and construct an expensive new entry in 1932. The fire was still smouldering after over 40 years ... By August 1976, almost all of the burning coal had been dug out from the seam which was at last exposed at the bottom of one of the pits."

76 Den Otter, "Railways and Alberta's Coal Problem," 97. Coal Miners Rehabilitation Act, S.A. 1954, c. 12.

opened with the justification that "the coal mining industry is experiencing conditions so difficult that great hardship and injustice would ensue" were the province not to assist the industry.[77] In 1959, with no sign of the industry reviving, Manning extended the order for another five years. This measure enabled these companies to hold onto their lands and wait out what was hoped to be a short-term decline.

Beyond Alberta, the fate of the coal industry preoccupied the Dominion Coal Board in the 1950s, which argued that "the Government of Canada have a direct interest in the prosperity of the coal mining industry and the communities dependent upon this industry."[78] The board highlighted measures that had already been taken by different levels of government, including subvention payments begun in 1928 to assist the transport of coal from areas of production to markets across the country (lowered transportation costs could enable Canadian coal to sometimes compete with cheaper US products) as well as efforts taken by various authorities to attract new industries to existing coal areas where they could draw directly on the energy supply.[79] The board also advocated additional measures. They pushed for further research into coal-fired gas turbine engines, argued that all government buildings had a responsibility to use Canadian rather than imported coal, and, perhaps most significantly, emphasized the potential for coal to supply Canada's electricity needs, particularly in those parts of the west (like Alberta) where there was limited hydroelectric development.[80] One of the most significant measures taken by the federal government in response to the crisis in the coal industry was the Maritime Coal Production Assistance Act passed in December 1949.[81] The act was designed to assist with financing the mechanization of Nova Scotia and New Brunswick mines, and companies used loans secured through this act to purchase draglines and other equipment

77 Order in Council 662/54, 7 May 1954, and Order in Council 225/59, 16 February 1959, file 2563, GR 1977.0237, PAA.

78 "A Canadian Coal Production Policy and Plans to Apply This Policy," n.d., file 2826, GR 1977.0237, PAA.

79 Subvention aid ended in 1971 when new markets for coal enabled its economical production and distribution, "without such public assistance." ERCB, *Alberta Coal Industry,* 2–8.

80 The board specifically recommended that the federal government should encourage the development of "coal burning electric generating plants in the Maritime Provinces and in Western Canada by means of loans through the Industrial Development Bank or by other financial assistance." Quoted in "Canadian Coal Production Policy."

81 Maritime Coal Production Assistance Act, S.C. 1949, c. 29.

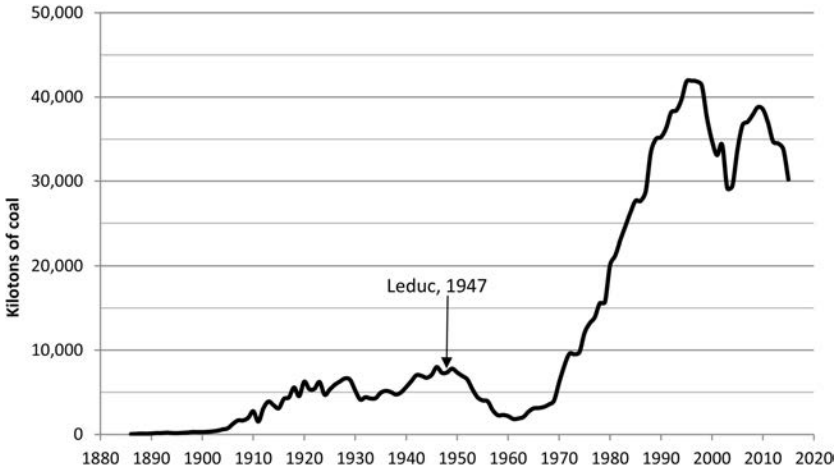

FIGURE 5 Coal production in metric kilotons, 1886–2015
Source: Data gathered from annual reports of the Alberta Mines Branch, the Alberta Mines Division, and the ERCB; from ERCB, *Alberta Coal Industry Monthly Statistics* (Calgary: ERCB, 2000–2015); and from Alberta, Bureau of Statistics, *Facts and Figures* (Edmonton: Department of Industries and Labour, 1954).

for strip-mining. The act was amended to apply to mine operations across the country later in the 1950s, when the crisis in the coal industry became widespread. Companies in Alberta, like Canmore Mines, for example, applied for loans from this act into the 1960s, and this measure directly contributed to the overall consolidation and mechanization that took place within the industry in the 1950s and 1960s.[82]

Coal production turned around in 1962 and grew each year until it peaked in 1996, at which time production began to fall again (see Figure 5). A transition in the use of coal came about in the 1950s, exemplified when Calgary Power (later TransAlta) constructed a natural gas-fired power plant at Wabamun village in 1956 and then converted it to a coal-fired plant in 1962. Coal-fired power plants appeared in Alberta alongside the coal mines, with the first dating from 1874 (to power a mine) and then a second built to power the city of Lethbridge in 1893. As noted earlier, coal and natural gas both supplied the

82 D.A. Edgar to C.L. O'Brian, 20 September 1965, file 2685, GR 1977.0237, PAA. Not all of the mechanization, it should be noted, entailed conversion to surface mining. In the case of Canmore Mines, it was to facilitate underground work.

energy to power urban and rural homes and businesses throughout the twentieth century. The appeal of natural gas surged in the 1950s, but it never fully displaced coal. In 1954, for instance, in the midst of the decline in the coal industry and the seemingly inevitable rise of natural gas, the Forestburg (later Paintearth) mines entered into an agreement with Canadian Utilities to supply the coal for the new Battle River power station.[83] Calgary Power's decision to convert its power plant to coal, after such a short period of time, further signalled a shift in the provincial resource and industrial strategy.

The Alberta Research Council, the province's "principal research agency," which focused on the development of mineral and energy resources, investigated the coal reserves in the Wabamun Lake area in 1959 in the hopes of attracting and supporting industry.[84] The prospect of supporting provincial industrial activity through the exploitation of readily accessible sub-bituminous coal reserves was enthusiastically taken up by policy-makers and, of course, the coal industry in the 1950s and 1960s. By creating a desperately needed new market for coal, and one that relied primarily on the grade of coal that was not suitable for export (thus allowing supply to drive demand), integrated planning could bolster industrial activity within the province while freeing up higher value natural gas and oil for export. The exploitation of domestic coal reserves would also ensure inexpensive electricity to domestic consumers. The Wabamun plant was joined by the Sundance and Keephills plants on the south side of Wabamun Lake, which came online in 1970 and 1983 respectively, all of which were fuelled by extensive surface-mining operations in the area just west of Edmonton. By 2010, the coal plants that Calgary Power had established on the shores of Wabamun Lake would rank among the largest emitters of greenhouse gases in Canada. That year, Sundance ranked first, exceeding Syncrude's Mildred Lake and Aurora North oil sands plants in northern Alberta. Keephills ranked sixth.[85]

83 Maydonik, *Luscar Story*, 82.

84 For more on the Alberta Research Council, see Alberta, *An Administrative History of the Government of Alberta, 1905–2005* (Edmonton: Provincial Archives of Alberta, 2006), 382–9.

85 Weis et al., *High Costs of Cheap Power*, 4. The five coal-fired power plants in Alberta that are featured in this list all came online by the 1980s. Sundance's emissions in 2010 were 15.8 megatons of carbon dioxide (Mt CO_2), Mildred Lake and Aurora North combined emitted 12.7 Mt CO_2, the Genesee Generating Station in Alberta ranked third with 9.1 Mt CO_2, Keephills emitted 6.8 Mt CO_2, and the Sheerness Generating Station (in tenth place) emitted 4.9 Mt CO_2.

Alongside the shift to coal-powered thermal energy, the long-standing search for new export markets finally bore fruit. Japan offered the greatest potential as it rebuilt its industrial capacity in the post-war period. This included the reconstruction of the country's iron and steel industry, which relied on imported fossil fuels and, specifically, on metallurgical coal, a higher-grade coal that came from the mountains and foothills. By 1954, Japan was importing thirty million tons of coal annually, primarily from the United States. Given that subsidizing the continued use of coal-burning locomotives was ultimately a losing proposition, the possibility of new trade relationships received attention from both the federal and provincial governments. In the early 1960s, the coal industry lobbied for subventions to assist in exporting coal to Japan, and by the mid-1960s, Japanese trading companies actively looked to western Canada for new sources of coal.

By 1965, companies in Alberta were signing contracts with Japanese consumers for metallurgical coal. Canmore Mines, for instance, when it applied for federal government assistance with mechanization, noted that about 70 per cent of its sales (amounting to 150 kilotons annually) went to Japan, with the remainder primarily directed at Canadian and US consumers. By 1967, Coleman Collieries had signed a fifteen-year contract with Japanese steel mills, which required that it rapidly increase production so as not to default for failure to deliver. Luscar Coal also signed a fifteen-year contract with Japanese steel mills in 1969 for one million tons of coal annually from its Cardinal River operations.[86] The provincial goal was to increase Alberta's share of Japan's export market from 2 per cent to 40 per cent.[87] In his study of coal mining in the Crowsnest Pass up to 1971, Lake clarifies that the role of export demand in turning around coal production in the late 1960s came not from the "sudden emergence of a huge market" but, rather, from the ability of coal companies and the railways to produce and transport metallurgical coal to Japan at globally competitive prices.[88] These competitive prices depended on mechanization and the turn to surface mining. In the case of the Luscar mine, the provincial government further assisted by sharing the costs of building a road from Hinton south to Luscar in 1969 to serve the mine. The coal produced at Luscar was transported to coal-loading facilities at the Neptune

86 Maydonik, *Luscar Story*, 107; Lawrence Welsh, "McIntyre Has New Contract on Coal Sales," *Globe and Mail*, 14 April 1973, M-8180–445, series 20, Coal Association of Canada fonds (CAC), GMA.

87 W.R. Hanson to Chairman and Members of the Eastern Rockies Forest Conservation Board, 15 September 1969, file 4–10, box 9, item 168, GR 1974.0049, PAA.

88 Lake, "Study of Landscape Evolution," 142.

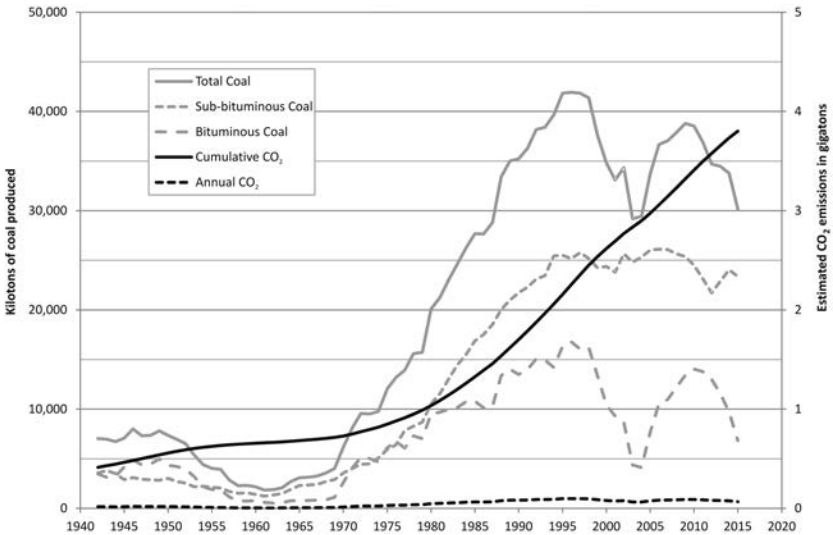

FIGURE 6 Coal production (total, sub-bituminous, and bituminous) in metric kilotons on left axis and annual and cumulative CO_2 emissions in gigatons on right axis, 1942–2015.
Source: Data gathered from annual reports of the Alberta Mines Branch, the Alberta Mines Division, and the ERCB; from ERCB, *Alberta Coal Industry Monthly Statistics* (Calgary: ERCB, 2000–15); and from Alberta, Bureau of Statistics, *Facts and Figures* (Edmonton: Department of Industries and Labour, 1954).

Terminals in Vancouver by CN. That said, the expansion of the export market remained constrained by high transportation costs.[89]

Coal for power production did not need to be as high grade as that required for iron and steel manufacturing; typically, sub-bituminous coal was used in electric power plants compared to bituminous coal, which was exported. Looking at the production statistics for these two different kinds of coal during this period illuminates how the industry was changing (see Figure 6). Bituminous coal was affected by the coal market's steep decline in the 1950s, with production falling much more dramatically than it did with sub-bituminous coal in the mid-1960s. Demand for sub-bituminous coal persisted because of its value in electric power generation. The opening of the Japanese export

89 Thomas Kennedy, "Alberta Plans Major Role for Coal in Export of Energy," *Globe and Mail*, 17 April 1973, M-8180–445, series 20, CAC, GMA.

market led to the rapid rise in the demand for bituminous coal, such that by 1971 the sale of bituminous coal exceeded the sale of sub-bituminous coal by hundreds of thousands of tons for several years. Importers and consumers of Alberta metallurgical coal included Mitsubishi Corporation, Nippon Steel, Kawasaki Steel, Mitsubishi Chemical, Tokyo Gas, and Osaka Iron.[90] This relationship switched abruptly in 1977, and, thereafter, sub-bituminous production always exceeded bituminous production leading into the twenty-first century. The sustained demand for sub-bituminous coal came from thermal power generation.[91]

By the early 1970s, "the recent slump in the oil industry" led to calls to further develop Alberta's alternate energy sources, including the tar sands and coal.[92] In June 1971, with industry and government concerned about the production plateau reached by the conventional oil industry, Alberta's Oil and Gas Conservation Board was renamed the Energy Resources Conservation Board (ERCB), and its jurisdiction expanded to include coal and hydro resources, although hydro was publicly dismissed as being of little importance.[93] Concern over the conventional oil industry was only amplified with the 1973 crisis surrounding the Organization for Petroleum-Exporting Countries and the fraught oil politics of that decade. Prospects for coal included the possibility for coal gasification to compete with natural gas.[94] The production of coal gas first dated to early nineteenth-century England, where coal gas fixtures were used to provide lighting. This technology endured for several decades after the introduction of electric lights.[95] By the 1970s, it was argued that coal gas could be exported via the pipelines that had been constructed to distribute Alberta's rich natural gas reserves. Indeed, George Govier, chair of the ERCB said in a 1971 interview with the *Globe and Mail* that "gas derived from coal will be

90 For a full list, see ERCB, *Alberta Coal Industry*, Table 5–1.

91 Thermal power stations convert heat energy to electric energy.

92 "Tar Sands, Coal Effort Urged to Aid Economy," *Calgary Herald*, 27 May 1971, M-8180–445, series 20, CAC, GMA; see also Larry Pratt, *The Tar Sands: Syncrude and the Politics of Oil* (Edmonton: Hurtig Publishers, 1976).

93 Thomas Kennedy, "Pipeline Fuel from Coal Termed Important by Eighties," *Globe and Mail*, 17 July 1971, B5, M-8180–445, series 20, CAC, GMA. Hydro power from Lake Minnewanka, dammed and raised in Banff National Park during the Second World War, had nevertheless served a very important role by supplying power to industrial activity and urban centres in Alberta, which was needed to compensate for wartime coal shortages. See Evenden, *Allied Power*, 160–2, 192.

94 Coal gasification is distinct from the fracking techniques used to produce coal bed methane.

95 Vaclav Smil, *Energy in World History* (Boulder: Westview Press, 1994), 160.

needed 'just to keep existing pipelines filled' by the Nineteen Eighties [*sic*]."[96]

By the 1970s, the provincial government's commitment to coal had markedly strengthened. Having a coal industry representative on the ERCB (and, indeed, for a while as its chair) certainly helped. This enabled the industry to publicly argue for the importance of creating domestic demand for coal. By 1973, the ERCB was calling for the development of coal-fired power plants to meet the growing electricity demands of the province, to create jobs in the energy sector, and to "liberate" natural gas, which was then being used for domestic power production and which could instead be exported for greater profit.[97] Indeed, any new power utilities in the province were to be coal fuelled, although existing natural gas-powered facilities would not be affected. The rising prices for oil and natural gas in the 1970s contributed to this shift. One of the most significant impediments to effectively marketing Alberta coal in the twentieth century had been the issue of transportation – the province's major coal reserves were located a considerable distance from major industrial markets and centres of population in Canada and beyond. Fuelling the railways had, in the first part of the twentieth century, offered one means of circumventing this disadvantage, until the railway market collapsed. The rise of an overseas export market in the 1960s offered initial relief to the desperate coal industry, but it was the growth of the domestic electricity market that drove the significant increase in coal production after 1970. When industries used coal to produce electricity, and situated mines and power plants side by side, they eliminated the transportation challenges that affected the pre-war industry or the post-war export operations. With the accelerated construction of pipelines beginning in the 1950s, it was also much easier and cheaper to export natural gas compared to coal. If natural gas was not going to power Alberta, then coal could. This was part of a strategy, promoted by the ERCB and the Progressive Conservatives, "to promote simultaneous development of all its resources."[98] And, as the prospects for coal improved, particularly in the context of an uncertain oil market, investment also shifted. Now rather than coal

96 Kennedy, "Pipeline Fuel."

97 Kennedy, "Alberta Plans"; see also ERCB, *Alberta Coal Industry*, 1-5, 5-2. Robert Lifset is currently exploring the role of the state in encouraging the massive expansion of demand for coal in the 1970s. He has written widely about US energy history. See, for instance, Robert Lifset, ed., *American Energy Policy in the 1970s* (Norman: University of Oklahoma Press, 2014).

98 "Board Recommends Use of Coal for Alberta Power Plant Fuel," *Globe and Mail*, 14 April 1973, M-8180–445, series 20, CAC, GMA.

companies like Luscar Coal picking up oil holdings, oil companies like Shell invested in coal.[99]

THE GOLDEN AGE OF COAL

The volume of coal produced in Alberta grew almost twenty-three times over in the period from 1961 (1840 kilotons) to its peak in 1996 (41,929 kilotons). This growth in production corresponded directly to a growth in the consumption of coal by thermal electricity generation plants, as is evidenced in the continued, steady increase of subbituminous coal production up to the mid-1990s (see Figure 6). By the early 1990s, 75 per cent of the province's electrical capacity was coal-based, with the reminder evenly split between natural gas and hydroelectric power generation.[100] Coal from the plains was used for electricity generation in Alberta, with the single largest operation at Highvale, a mine opened by Calgary Power south of Wabamun Lake in 1969. By 1998, Highvale alone produced 49 per cent of the subbituminous coal used for power generation in Alberta.[101] It remains Canada's largest surface coal mine, with coal being extracted from over forty-three square kilometres, an area about the same size as the city of Camrose.[102] The Bucyrus Class 24 in Figure 4b has a 2.7 cubic metre bucket. The dragline buckets working at Highvale mine by the turn of the twenty-first century ranged from forty-one to eighty-four cubic metres and included one of the largest machines in the world –

99 Globally, coal boomed in the 1970s. Galuszka, *Thunder on the Mountain*, 97. Shell was the largest company picking up coal leases. More commonly, small to mid-sized operators held coal properties. These companies included Pancanadian Petroleum, Canadian Superior Oil, Scurry-Rainbow Oil, Siebens Oil and Gas, Canadian Industrial Oil and Gas, Canadian Pacific Oil and Gas, and Hudson's Bay Oil and Gas. See ERCB, *Alberta Coal Industry*, Figure 4–1, for a map of the major coal rights holders. See also file "Lease Applications East Slopes Area," March–April 1975, box 4, GR 88.165, PAA. See also "Gulf Runs into Conflict with Miners," *Calgary Herald*, 14 November 1980, M-8180–445, series 20, CAC, GMA.

100 The three main generators (responsible for 90 per cent of the province's total generation capacity of 8600 megawatts) were TransAlta, Alberta Power, and Edmonton Power. See Terry Daniel, Joseph Doucet, and André Plourde, "Electricity Industry Restructuring: The Alberta Experience," in *Electric Choices: Deregulation and the Future of Electric Power*, edited by Andrew N. Kleit (Plymouth: Rowman and Littlefield, 2007), 92–3.

101 Garnet T. Page, "Coal: An Alberta Advantage," unpublished report (April 1998). Page was the former president of the Coal Association of Canada.

102 This figure was calculated from the AER, *Coal Mine Atlas*. Highvale is mine no. 1769.

the Misikitew (Cree for "the big one") dragline.[103] Many of these earth-moving machines are electric or diesel-electric powered, meaning that the industry relies on its own products to continue extracting coal.

Beyond the plains, bituminous thermal coal from the foothills was exported to Ontario Hydro (via a bulk coal-loading port constructed in Thunder Bay in the mid-1970s) and to Japan and South Korea (via terminals in Vancouver and Prince Rupert). Bituminous metallurgical coal from the mountains went even farther, to steel mills in Japan and Brazil as well as to other countries in Europe, South America, and Asia.[104] As closely as the province tracked the production and disposition of coal, after the 1950s, it left the collection of labour figures to Statistics Canada, and they rarely appear in provincial reports. Direct employment in the coal industry did not grow commensurate with production. Employment had peaked in 1921, when the industry employed 10,684 men.[105] Into the 1940s, the mines employed on average 8500 people each year. By 1953, employment had already dipped to 5780 and, by mid-1973 (by which point, production had turned around), this figure was only 1900. In that same year, the ERCB optimistically anticipated total direct employment to rise "to 6,100 in 1978 and 9,300 in 1982," given the sustained growth within the coal industry.[106] But, by 1992, direct employment arising from coal mining amounted to 2350 jobs in Alberta – a far cry from the hopes expressed in the early 1970s.[107] Indeed, critics of the controversial Cheviot project in the late 1990s and into the early twenty-first century, pointed out that its advocates had exaggerated its anticipated employment benefits.[108] This latter golden age of coal was animated by machines and strip-mining, not by coal miners nor the power of their unions.

103 Alberta, Culture and Tourism, "Large-Scale Surface Mining in Alberta," http://history.alberta.ca/energyheritage/coal/reinvention-1950-onwards/transformation-and-innovation/large-scale-surface-mining.aspx (accessed 24 May 2017); Dave Cooper, "The Big One," *Edmonton Journal*, 5 June 2010. The dragline was named by schoolchildren from the nearby Paul First Nation. See also Keith Haddock, *Bucyrus: Making the Earth Move for 125 Years* (St Paul: MBI Publishing, 2005), 95.

104 Destination markets for the different grades of coal are specified in the annual reports of the Alberta Mines Branch, the Alberta Mines Division, and the Energy Resources Conservation Board.

105 Alberta, Bureau of Statistics, *Facts and Figures* (Edmonton: Department of Industries and Labour, 1954), 116. The source does not specify whether this was full time or seasonal employment.

106 ERCB, *Alberta Coal Industry*, iv.

107 Garnet T. Page, "The Alberta and Canadian Coal Industry Statistical Data to December 31, 1992," unpublished report (May 1993).

108 Ecojustice, "Cheviot Coal Mine Case Goes Back to Court," 13 January 2010, http://www.ecojustice.ca/pressrelease/cheviot-coal-mine-case-goes-back-to-court/ (accessed 24 May 2017).

The rise of strip-mining, where diesel and electrically powered machines, rather than workers, prevailed in the extraction of coal, firmly embedded coal mining within Alberta's post-war fossil-fuelled economy. The make-up of the coal industry ceased to resemble its pre-war counterpart. It now had far fewer, and less-skilled, workers pursuing collective action from within less-powerful unions and a handful of companies that relied primarily on earthmoving machines responsible for production that dwarfed pre-1945 levels. Coal was integral to Alberta's industrial and resource strategy, which exported high-value natural gas and oil as well as the higher-grade coal products, while relying on lower-grade coal to meet provincial electricity needs to power homes, businesses, industries, and, to a certain degree, coal mining itself. Coal production, in its dramatic growth after 1962, not only reflected the dramatic rise in the consumption of electricity in this period (encouraged in large measure by the rise of inexpensive oil and gas) but also amplified the greenhouse gas emissions of the oil and gas industry. The integration of coal and other fossil fuels in the post-war period belies the suggestion that the nature of these resources was either stable or essential to the economic and political relationships they engendered.[109] Rather, the case of coal in late twentieth-century Alberta highlights instead the central importance of the modes of extraction, the transition in industrial uses, and the place that these particular resources held within the larger industrial strategies that historically embraced a diversity of resources. Coal contributed directly to the unprecedented economic growth of the province in the late twentieth century, as it provided cheap power, while natural gas and conventional and synthetic oil could be exported for profit. Coal also contributed directly to the dramatic rise in greenhouses gases: each ton mined and burned, whether consumed at the Sundance Power Plant or the Osaka Iron Works, produced carbon dioxide emissions that went into the earth's atmosphere. By 1945, the cumulative amount of carbon dioxide emitted by Alberta coal was 463,754 kilotons. By 2015, this amount had reached 3.8 gigatons (see Figure 6).[110] As the province aims to address climate change, in part

109 Mitchell, *Carbon Democracy*, 2.

110 These are estimated carbon dioxide emissions from Alberta coal and were calculated using analyses of the carbon content of different coals mined in the province. Edgar Stansfield and W. Albert Lang, *Coals of Alberta: Their Occurrence, Analysis and Utilization*, Research Council of Alberta Report no. 35 (Edmonton: A. Shnitka King's Printer, 1944). The known carbon content for sub-bituminous and bituminous coal mined historically in Alberta was used to arrive at factors of 0.57147 and 0.74701 respectively; a factor of 0.65756 was used to calculate the carbon dioxide emissions per ton where the rank of coal was not specified.

through the elimination of coal-fired power, we need to appreciate how fully coal – not just oil – has permeated our society and economy.[111] Well beyond the communities of Grande Cache or Hanna, Albertans have depended on coal for over fifty years; moving away from this dependence is no small task.

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111 See, for instance, Warren Cariou's *Petrography*, http://www.warrencariou.com/petrography/ (accessed 24 May 2017), which is one of many recent articulations of the extent to which contemporary Canadian and global cultures are interwoven with fossil fuels.