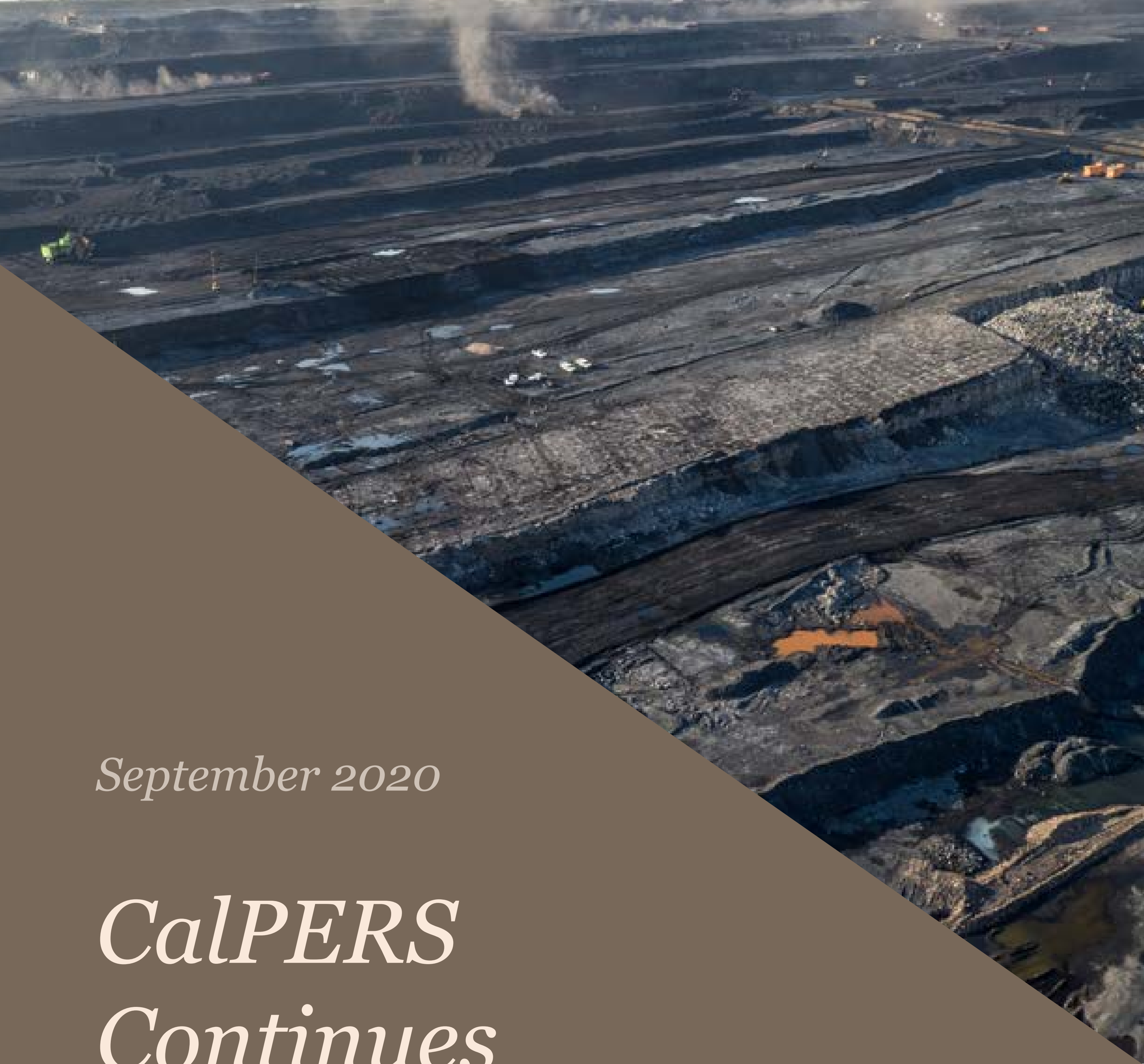

September 2020

CalPERS Continues to Invest in Coal

Fossil Free California

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CalPERS Continues to Invest in Coal

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Cover Photo Credit: Nathalie Bertrams - Exxaro mine in South Africa for thermal and semi-soft coking coal using a conventional truck and shovel operation

The Grootegeluk Coal Mine, operated by Exxaro, is one of the largest coal mines in South Africa. The open pit mine lies within the Waterberg Coalfield of Limpopo province. CalPERS has nearly $9 million invested in Exxaro.
Photo credit: Nathalie Bertrams

Executive Summary:

Despite its 2017 Coal Divestment, CalPERS still has $6.5B Invested in the Thermal Coal Value Chain

Fossil Free California analyzed the most recent portfolio data from the California Public Employees Retirement System (CalPERS), to better understand how the nation's largest public pension fund has complied with the intent and mandate of a 2015 California state law directing public pension funds to divest from coal. Our analysis found that, despite a partial divestment in 2017, CalPERS' portfolio still holds millions in thermal coal producers and coal-fired utilities, and continues to invest in companies that meet the law's (highly constrained) definition of "coal investments."

Additionally, using the Global Coal Exit List (the most comprehensive database on the coal industry, already used by hundreds of financial institutions to inform their coal policies), our analysis shows that CalPERS has *increased* its investments in coal. The most recent data shows CalPERS has billions invested in the entire coal value chain – including companies that hold the world's largest coal reserves.

CalPERS' coal policy lags far behind many other institutional investors. The fund's coal investments have lost value, and global economic and policy trends indicate that investments in the coal sector are unlikely to prove profitable in the future. We question why the fund is continuing to invest in an unprofitable industry, which the California State Legislature has identified for divestment and the International Panel on Climate Change (IPCC) has clearly indicated must be phased out entirely by 2050 to ensure a livable planet.

Introduction

In 2017, the California Public Employees Retirement System (CalPERS)—the largest state pension fund in the US—divested assets worth $14.7 million from 14 coal companies. The divestment was required by SB185, the Public Divestiture of Thermal Coal Companies Act,[1] and CalPERS is now widely perceived to have divested from coal.[2] However, an analysis of CalPERS' June 2018 and June 2019 portfolios shows that, in fact, CalPERS increased their investments in coal mining and the coal supply chain by $1.5 billion from 2018 to 2019, for a 2019 total of $6.5 billion in coal-related holdings[3] – dwarfing their meager divestment.

In 2018, the IPCC laid out recommendations for emissions pathways and system transitions necessary to limit global warming to 1.5 degrees Celsius. These findings indicate that 61-78% of coal must be completely phased out by 2030.[4] Coal faces shrinking demand, pressure from climate campaigners and restrictive government policies, and competition from cleaner fuels – leading many to believe the industry is now in terminal decline.[5] More than 200 financial institutions internationally have begun to adopt investment policies limiting their exposure to the coal sector; however CalPERS' coal policy lags far behind that of its institutional investor peers, particularly those in Europe.[6]

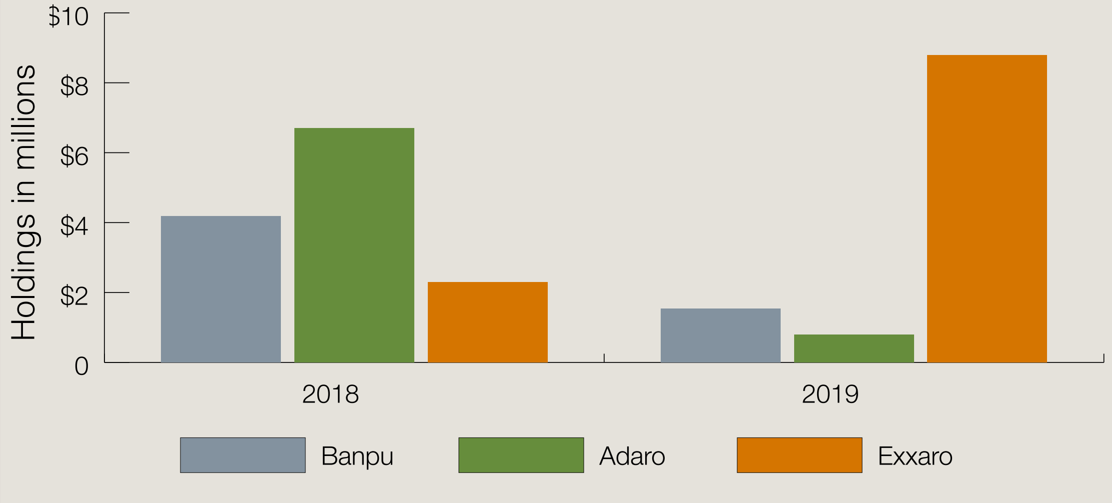
Compliance with California Coal Divestment Law

CalPERS' Portfolio Still Holds Millions in Coal, According to the SB185 Definition

SB 185, passed in 2015 by the California Legislature, directed California's two mega-pension funds (CalPERS and the state teachers' retirement fund, CalSTRS) to divest from thermal coal companies by July 1, 2017.[7] The law declares that combustion of coal is the largest contributor to global climate change by the U.S., and that divestment from thermal coal is consistent with the funds' fiduciary duty. However, as written, the law prohibits only a small fraction of coal investments, requiring CalPERS and CalSTRS to divest from companies

1 Adam Ashton, CalPERS divests from coal, *The Sacramento Bee,* August 8, 2017.
2 See, e.g., Nick Engelfried, After a big win against coal, NY climate activists are closer than ever to ending all fossil fuel investments, Waging Nonviolence, August 13, 2020.
3 This analysis is based on CalPERS' Annual Investment Reports, the Global Coal Exit List, and data analysis from 350.org.
4 Intergovernmental Panel on Climate Change Special Report on 1.5 degrees Celsius, Summary for Policymakers — Global Warming of 1.5 °C, October 8, 2018,14.
5 Fred Pearce, As Investors and Insurers Back Away, the Economics of Coal Turn Toxic, Yale Environment 360, March 10, 2020.
6 Reclaim Finance Coal Policy Tool.
7 CalPERS Public Divestiture of Thermal Coal Companies Act Report to the California Legislature and Governor, July 14, 2017.

Figure 1: CalPERS Coal Holdings in Major Coal Companies in 2018 and 2019



that generate 50 percent or more of their revenue from the mining of thermal coal.[8] Given coal's decreasing value, and the dwindling number of 'pure play' coal companies, only a small number of coal investments today meet this high threshold.

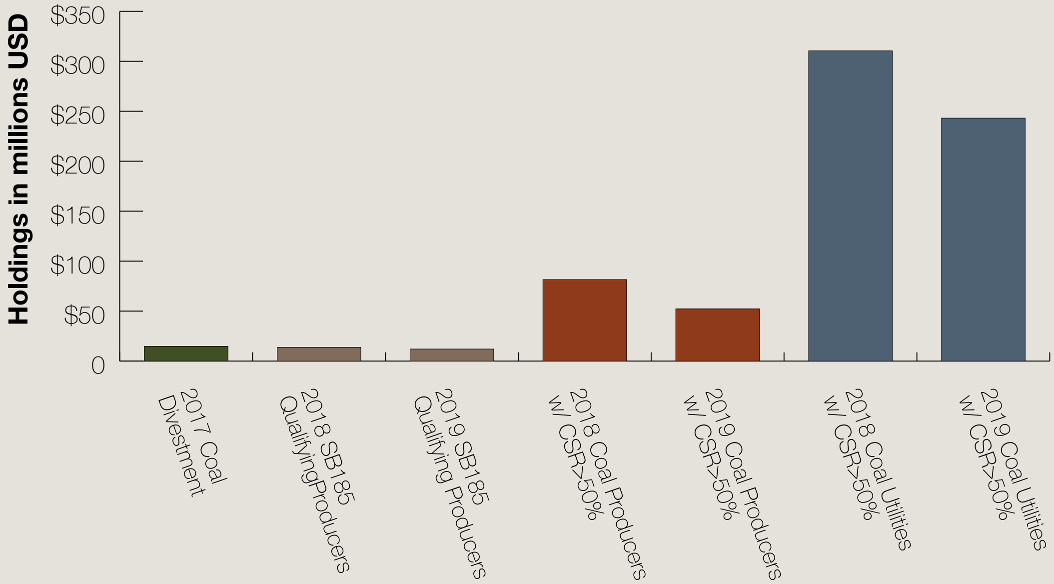
Using SB185's definition to identify 25 companies as "thermal coal companies" in a 2017 report[9], CalPERS revealed that it owned shares in 17 such companies. The fund then "divested from coal" by divesting from 14 of the 17 companies. The remaining three (Banpu, Adaro, Exxaro) were not divested because the companies made ill-defined, open-ended claims to be shifting to cleaner energy.[10]

Between 2018 and 2019, CalPERS decreased its shares in Banpu from 7.1 million to 3.6 million ($4.18 million to $1.54 million in market value) and decreased its shares in Adaro from 53.7 million to 8.3 million ($6.7 million to $803,000 in market value). However as Figure 1 shows, CalPERS *more than doubled* its investment in Exxaro, from 311,000 shares in 2018 to 798,000 in 2019 ($2.3 million (share price $8.37) to $8.8 million (share price $11.01)). Exxaro is currently trading at $8.23, as of September 4, 2020.

Exxaro is a coal company with a long history of environmental justice violations in South Africa,[11] where its coal mining operations have had a devastating impact on local water supply in particular.[12] Banpu and Adaro operate coal mines in Indonesia, where the vast majority of coal is excavated via strip mining. Beyond the obvious concerns about California's public employees investing in environmentally and socially destructive practices

8 Bill Text - SB-185 Public retirement systems: public divestiture of thermal coal companies.
9 CalPERS 2017 Coal Divestiture Report.
10 CalPERS 2017 Coal Divestiture Report.
11 Boom and Bust in the Waterberg, A history of coal mega projects, The groundWork Report, 2018.
12 Full Disclosure, The Truth about Mpumalanga Coal Mines Failure to Comply with their Water Use Licences, The Centre for Environmental Rights, July 2019

Figure 2: CalPERS Coal Divestment vs Holdings in Major Coal Companies



in the global south,[13] this increased investment also opens the question of *whether CalPERS has even fully complied with SB 185* given that Exxaro's strategic vision is to use its "primary commodity - coal... to fuel our future."[14]

Investments in Majority Coal Companies

Holdings in the rest of the coal value chain, beyond coal mining, do not technically qualify as "thermal coal companies" by SB 185 criteria. However, coal-powered utilities in particular are a critical - and heavily polluting - part of the coal industry, and they carry similar financial risk: most coal-fired power plants now cost more to operate than other power generation sources, such as natural gas, wind, and solar PV.[15] On the basis of cost alone, many coal-fired power plants are now scheduled to be retired even before the end of their useful life.[16]

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13 Environmental problems caused by coal mining are beyond the scope of this paper. Briefly, however, in South Africa these include loss of arable land; pollution of surface and underground water; dangerous coal dust emissions; pollution from the spontaneous combustion of discard coal stockpiles; and use of vast amounts of water in a country facing severe water shortages. (Life_After_Coal/Impilo_Ngaphandle_Kwamalahle, January 2019.) Environmental destruction from coal mining in Indonesia, home to Banpu and Adaro coal mines, includes the ruination of forests and agricultural land; contamination of water and soil; dangerous abandoned mines; flooding, and community conflict. (Coal Miners Owe the Indonesian Government Hundreds of Millions of Dollars, Eco-Business, February 6, 2019.)

14 Register for free at CoalExit.org to access data on Exxaro's coal earnings; see Strategic Vision for quote.

15 https://en.wikipedia.org/wiki/Cost_of_electricity_by_source.

16 Timmer, John, EPA issues new rules on coal plant pollution, Ars Technica, September 1, 2020; More U.S. coal-fired power plants are decommissioning as retirements continue, U.S. Energy Information Administration, July

Nevertheless, *CalPERS has continued to invest in the thermal coal value chain:* in 2019 the fund had $243 million (down from $310 million in 2018) invested in coal-fired utilities that make the majority of their revenue from coal-related activities. These investments included Ameren Corporation and AGL Energy Industry, both of which make over 50% of their revenue from coal-fired utilities.[17] CalPERS' coal investments reflect a policy - whether stated or not - to maintain and/or increase investments in the entire thermal coal value chain.

In addition to its investments in three SB 185-qualifying companies (Banpu, Adaro, and Exxaro), in 2018 CalPERS owned assets worth $81.6 million in coal production companies that had a 50% or greater share of revenue from coal operations.[18] From the most recent publicly available portfolio data (June 2019),[19] *CalPERS still owns $52.2 million in six such companies.[20]* As Figure 2 shows, this is several times more than the $14.7 million that CalPERS divested from coal companies in 2017.

CalPERS also has substantial investments[21] in companies such as China Shenhua Energy (now part of China Energy) that both mine coal and own coal-fired power plants. While these companies' coal mining revenue share falls below SB 185's 50% threshold, they are juggernauts in the coal industry: China Energy mines 510 megatonnes of coal annually[22] and it has the capacity to produce 175 gigawatts of coal-powered electricity. Not surprisingly, China Energy is one of the top 25 companies on CalPERS' list of its Scope 1 and 2 emitters.[23] While CalPERS' coal-related investments have decreased in value, in June 2019 CalPERS still owned $48 million in assets issued by China Energy.

26, 2019.

17 See footnote (3).

18 This measure of coal share of revenue includes coal mining, but also other measures of coal operations. See the Global Coal Exit List's methodology for more information.

19 CalPERS 2018-19 Annual Investment Report.

20 These companies are: Exxaro, China Shenhua Energy, Banpu, Adaro, CONSOL Energy, Shougang Fushan Re sources, DMCI Holdings, New Hope Corp, and NACCO Industries.

21 In 2018 CalPERS invested $75 million in China Shenhua Energy. CalPERS 2017-18 Annual Investment Report.

22 For context, Exxaro total coal output in 2019 was 45.3 megatonnes. Exxaro Condensed Group Annual Financial Statements for the Year Ended 31 December 2019.

23 Calpers' Investment Strategy on Climate Change, June 2020, 46, 59.

Increases in Coal Exposure Since 2017

In 2019, CalPERS Added Billions in Companies that are Part of the Thermal Coal Value Chain

SB185's simple "50 percent share of revenue from mining thermal coal" criterion for determining a company's coal-related operations is clearly insufficient for developing a meaningful coal policy that takes into account the financial, reputational and planetary risks of coal investments. Analysis using broader, more sophisticated criteria reveals that CalPERS is not only deeply invested in the coal industry – but has actually increased its coal exposure since 2017.

The Global Coal Exit List (GCEL) is used by financial Institutions representing nearly US $13 trillion Assets under Management to assess their coal exposure. Many — including Allianz, AXA, Munich Re, Lloyds of London, and others — have used at least one GCEL criterion to guide their divestment from the industry. Providing a comprehensive database of statistics on companies throughout the entire thermal coal value chain, the GCEL uses an expanded set of criteria to flag companies that meet at least one of the following five criteria:[24]

- *coal share of revenue greater than 30 percent,*
- *coal share of power production greater than 30 percent,*
- *produce 20 megatonnes or more of thermal coal annually,*
- *coal-fired power capacity of 10 gigawatts or more, or*
- *plans for coal expansion.*[25]

Satisfying any of these criteria indicates that a company has large operations in the coal industry, so this expands the number of "thermal coal companies" beyond SB 185's definition. For example, BHP Billiton, an Australian mining and petroleum company and (formerly) one of the top ten coal mining companies globally, is not considered a "thermal coal company" by the SB 185 definition. (BHP produces 29 megatonnes of thermal coal annually, and four gigatons of financed CO2 emissions are represented by its proven coal reserves.) In 2019, CalPERS still owned $343 million in BHP stocks. Recently, BHP itself pledged to divest its thermal coal holdings.[26]

Using the Coal Exit list criteria – which includes coal mining companies, coal-powered utilities, and other companies with coal operations – CalPERS' 2018 portfolio contained

24 The GCEL is currently being updated, to comply with the IPCC's requirements for a global temperature rise of <1.5 degrees C. The new criteria, expected in November 2020, will be even more stringent: the 30%, 20MT and 10GW threshold will be lowered to 20%, 10MT and 5GW. These thresholds are already used by several financial institutions in Europe, including by some of the largest worldwide. CoalExit.org/Methodology. Mining Technology, August 19, 2020.

25 CoalExit.org/Methodology.

26 BHP to divest thermal coal assets following investor pressure, Mining Technology, August 19, 2020.

coal assets worth $5 billion (1.43% of the portfolio). CalPERS' 2019 portfolio contains assets worth $6.5 billion (1.74% of the portfolio) in Global Coal Exit List companies: an increase of $1.5 billion over the 2018 portfolio. As shown by Table 1, increasing shares in Xcel Energy, American Electric Power, Enel SpA, WEC Energy Group, and the Southern Company (all utilities companies with coal power plants) accounts for much of the increase in 2019 over 2018. The value of CalPERS' investments in these companies increased by $927 million from 2018 to 2019; and most of the increase comes from a significant increase in the number of shares owned. Notably, two of these companies - the Southern Company and Enel SpA, are the first and fifth largest emitters, respectively, of Scope 1 and 2 emissions for companies in which CalPERS is invested.[27]

Table 1. GCEL Companies with Large Increases in Shares Held by CalPERS.[28]

Company	2018 Shares Held	2019 Shares Held	2018 Market Value	2019 Market Value
Xcel Energy	2.4 million	4.3 million	$111,088,690	$255,452,380
American Electric Power	1.5 million	4.2 million	$104,887,851	$366,215,243
Enel SpA	26.9 million	32 million	$149,315,528	$223,496,806
WEC Energy Group	900,000	2.5 million	$59,156,690	$207,985,057
The Southern Company	2.6 million	7.6 million	$120,611,848	$419,385,534
Total			**$545,060,607**	**$1,472,535,020**

Table 2 shows CalPERS' top coal and coal-related holdings. Duke Energy heads the list, with CalPERS owning $627 million in 2018 and $752 million in 2019 of Duke Energy. BHP is in second place, followed by Berkshire Hathaway Energy in third. CalPERS' holdings in these six companies with major coal operations totaled over $1.7 billion in 2018 and almost $1.9 billion in 2019.

27 Calpers' Investment Strategy on Climate Change, p. 46.
28 Numbers are based on 6/30/2018 and 6/30/2019.

Table 2. Top CalPERS Holdings In GCEL Companies.[29]

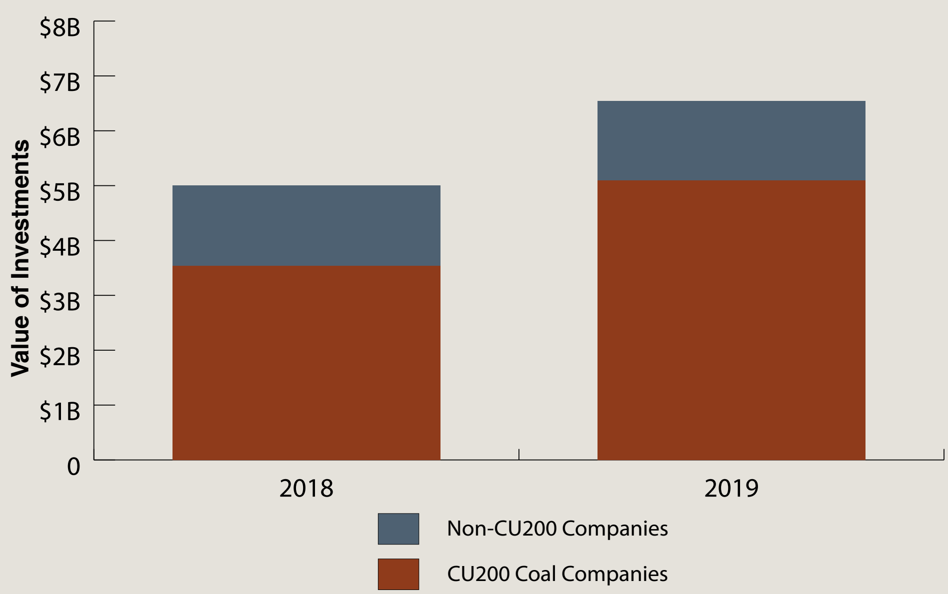
Rank	Company	CalPERS Holdings 2018	CalPERS Holdings 2019
1	Duke Energy	$627,450,590	$752,416,391
2	BHP	$327,404,526	$342,874,129
3	Berkshire Hathaway Energy	$248,376,703	$270,937,032
4	DTE Energy	$238,840,201	$219,398,017
5	Enel	$168,837,605	$232,747,975
6	Glencore	$123,330,187	$71,554,320
Total		**$1,734,239,812**	**$1,889,927,864**

CalPERS Investments in Companies with the Largest Coal Reserves

The Carbon Underground 200 (CU200) tracks the top 100 coal companies ranked by the size of their coal reserves.[30] As shown in Figure 3, CalPERS' 2018 portfolio's $5 billion in GCEL holdings includes $1.46 billion invested in 44 of the Carbon Underground's top 100 coal companies (2018). In 2019, CalPERS still owned $1.45 billion in 42 CU200 top 100 coal companies.

Investing in companies with large amounts of coal reserves is risky, because market forces

Figure 3: Proportion of CalPERS' GCEL Investments in CU200 Coal



29 Data is taken from June of the respective year.
30 http://fossilfreeindexes.com/research/the-carbon-underground/

and regulations will ultimately limit the extraction and selling of these coal reserves, which then become stranded assets. Moreover, the Paris Agreement carbon budget estimates that 80% of coal reserves must not be burned in order to stay under a 2°C global temperature rise; even this is conservative, as the IPCC has recognized the need to stay under 1.5°C.[31]

Table 3 shows that CalPERS' 2018 portfolios invested more than $100 million each in four of these CU200 coal companies. The 2019 portfolio continued to invest almost a billion dollars in ten of the CU200 coal companies.

Table 3. Top 10 CalPERS CU200 Coal Stocks.[32]

Rank	CU200 Coal Companies	2018 Market Value	2019 Market Value
1	BHP Billiton	$327,404,526	$313,302,044
2	Glencore	$123,330,187	$71,554,320
3	Vale	$107,764,534	$59,534,652
4	Mitsubishi	$106,276,408	$88,497,263
5	Mitsui	$94,207,188	$63,663,037
6	ITOCHU	$78,809,486	$70,147,804
7	China Energy	$75,303,021	$48,409,375
8	Anglo American	$72,814,272	$94,282,677
9	Sumitomo Corp	61,680,871	$41,750,831
10	CLP Holdings	$55,988,180	$134,375,500
Total		**$1,103,578,673**	**$985,517,503**

CalPERS' holdings in the CU200 coal companies once again shows how the value of CalPERS' current coal-related holdings goes far beyond the $14.7 million it divested in 2017. Many of these companies are diversified enough that they do not earn the majority of their revenue from coal mining, but they are, nonetheless, major coal mining companies that own significant coal reserves and face the risk of stranded assets.

Coal Investments in Context

CalPERS Lags Behind Global Investors on Coal Policy

Retirees and other stakeholders may well ask, "Why is CalPERS increasing its investments in coal and coal-fired utilities, when a livable future requires decreasing such investments?" The fact that other institutional investors are leaving the sector should also give CalPERS stakeholders reason to question the fund's current policy. Private banks and European asset

31 Christopher McGlade, Paul Ekins, The geographical distribution of fossil fuels unused when limiting global warming to 2 °C, Nature (2015) 517, 187–190, https://doi.org/10.1038/nature14016 (abstract).

32 Market values based on 6/30/2018 and 6/30/2019.

owners in recent years have developed coal policies that dwarf CalPERS' 2017 minimal 'coal divestment' efforts, as the recently-published Coal Policy Tool from Reclaim Finance outlines in detail.

The tool highlights 16 financial institutions that have adopted high-quality coal exit policies, all of which include ending all financial services that directly or indirectly support the expansion of the coal sector – either through direct support at the project level, or general corporate support to companies with coal expansion plans. These financial institutions also commit to eliminating their exposure to coal on a timeframe aligned with the Paris agreement, through the immediate exclusion of companies highly exposed to coal and a robust engagement strategy requiring companies to adopt a coal phase-out plan.

The highlighted institutions include Amundi, one of the largest asset managers worldwide, and many other French financial institutions. The Italian bank UniCredit recently joined this group, with its commitment to fully phase out coal by 2028, and to require its existing clients to share a coal phase-out plan by 2021.

AXA (the world's second-largest insurer) started excluding coal companies from their investment portfolio in 2015, and they have tightened their policy every other year since then.[33] Last year, they had excluded almost all 748 coal parent companies on the GCEL from their investment portfolio. Even among American financial institutions - which as a whole score below their European counterparts - CalPERS' coal policy is lagging: Axis Capital, Chubb, Liberty Mutual, MetLife, and The Hartford have all committed to coal policies that are better aligned with the Paris Agreement.

The Coal Policy Tool's assessment of all financial institutions, including the world's leading institutional investors, makes clear that CalPERS trails its peers, with a coal policy that fails to meet the requirements of a dangerously warming planet.

Coal Is Risky Business

Ongoing Coal Investments Pose Financial, Legal, and Fiduciary Risk

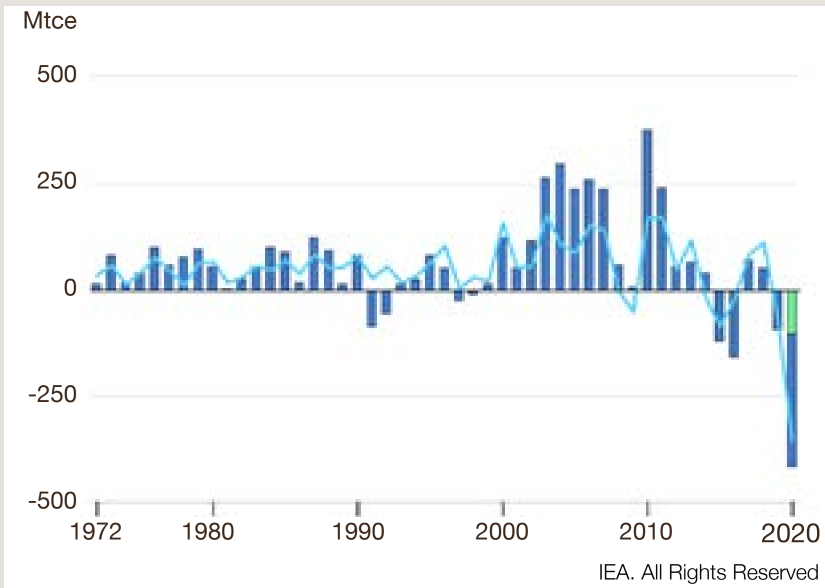
CalPERS' remaining investments in the declining coal industry are financially risky. For example, coal mining in South Africa, where Exxaro is located, faced financial pressures even before the Covid-19 market disruptions. The pressures were due to a decline in export demand; environmental concerns, especially with regard to water use; regulatory pressures; and increased difficulty in accessing investment capital.[34] The coal industry in Indonesia,

33 Emergency exit: committing to coal phase-out, Axa Magazine, Nov 27, 2019.
34 Brendan Ryan, The future of South Africa's coal industry is not what it used to be, Mining GMx Yearbook 2020, August 12, 2020; Simon Nicholas and Tim Buckley, South African Coal Exports Outlook Approaching Long-Term Decline, Institute for the Study of Energy Economics and Financial Analysis (IEEFA) Report, September 2019;

home to coal mines owned by Banpu and Adaro, faces similar financial and economic risks stemming from Covid-19; competition from renewables; lack of transparency by lenders; regulatory pressure due to climate change and reputational risks; and stranded assets.[35]

Figure 4 shows that demand for coal has been on a downward trend for over a decade. Globally, demand for thermal coal is expected to fall by 15% by the end of 2020, and in the United States the coal industry is in irreversible decline.[36] Coal's share of US power generation is now only about 18%,[37] and it was surpassed by renewables this year for the first time since record-keeping began.

Figure 4: Annual change in global coal demand, 1971-2020 -electric power (light blue) and industrial production (dark blue)[38]



CalPERS has already lost money on coal assets: in 2016, share prices for the 14 "thermal coal companies" from which CalPERS divested were at only 10 to 50 percent of their original purchase value.[39] The fund's current coal policy is positioning its portfolio to lose even more. For example, Duke Energy, like many owners of coal-fired utilities, faces continued litigation and financial risk due to its coal mining practices and the net negative value of its coal

South African water ruling could stall plans for future coal-fired power plants, IEEFA, August 14, 2020.

35 The Real Risks for Investors, An InfluenceMap Report, October 2019; Nithin Coca, Business risk and COVID-19 are pushing Asian financiers away from coal, Mongobay, August 3, 2020; Economic and Financial Risks of Coal Power in Indonesia, Carbon Tracker Briefing, October 2018.

36 Tsevetana Paraskova, The US Coal Industry Is Declining Irreversibly, OilChange.com, Jun 18, 2020.

37 Short-Term Energy Outlook, U.S. Energy Information Administration, August 11, 2020.

38 Global Energy Review 2020, Coal, International Energy Agency, April 2020.

39 Ashton, CalPERS divests from coal. Historically, coal reached an all-time high in January of 2011. After 2016, coal went up and down, and has been on a downward trend in the last two years. Trading Economics, Coal/Stats.

units.[40] BHP's coal assets are worth a billion dollars less than they were just two years ago, and it seems unlikely BHP will get what it is asking for its thermal coal assets, especially considering the massive clean-up costs at each mine's end of life. This follows an asset write-off of $2.94 billion two years ago, when BHP shed its U.S. shale gas holdings.[41]

Coal expansion projects simply do not make sense financially.[42] New investments in renewables are cheaper than new coal investments in all major markets today. New coal capacity investments are risky because the capital recovery period is typically 20 to 30 years—and by 2030 at the latest, it will cost less to build new wind and solar capacity than to continue operating coal plants in all markets.[43] Yet even with dismal future prospects, *62 of the Global Coal Exit List companies owned by CalPERS have plans to expand coal projects.*[44]

Conclusion

CalPERS has not followed the spirit of the SB 185 legislation; its coal investment policy fails both its current and future beneficiaries; and it has done nothing to improve that policy since 2017. It appears that the fund has instead poured even more of its members' money into these toxic investments, posing a material financial risk to a significant portion of the portfolio. CalPERS Board's fiduciary and legal duties require it to instruct staff to thoroughly identify and analyze the fund's coal holdings, in order to properly and conscientiously divest from the entire coal value chain.

40 In 2015, Duke Energy's operating companies in North Carolina pleaded guilty to numerous coal ash crimes. Nonetheless, Duke Energy continued to litigate to oppose cleanup for some additional ash pits, despite the fact that it remained on nationwide criminal probation. (More Pollution by More Toxic Substances Found at Duke Energy Coal Ash Sites, Southern Environmental Law Center (SELC), May 30, 2019.) It finally settled the case late last year. (N.C. settlement results in largest coal ash cleanup in America, SELC, January 2, 2020.) Duke is fighting in court to pass the costs on to ratepayers, which could cost up to about $8 or 9 billion. (Bruce Henderson, Digging up Duke Energy's coal ash will cost billions. Will customers pay for it?, *The Charlotte Observer*, January 22, 2020.) The Sierra Club has also asked the North Carolina Utilities Commission to disallow past spending on capital coal projects in recent years when the coal units had a net negative value. (Melissa Williams, Customers Shouldn't Be Forced to Pay for Duke Energy's Bad Decisions, Sierra Club, March 11, 2020.)

41 Tim Buckley, BHP coal assets worth a billion less than just two years ago, IEEFA Report, August 10, 2020.

42 Priscila Barrera, Coal Outlook 2020: Green Energy Threatens Prices, Demand, Investment News, January 1, 2020; Jonathan Watts and Jillian Ambrose, Coal industry will never recover after coronavirus pandemic, say experts, *The Guardian*, May 17, 2020.

43 How to waste over half a trillion dollars: The economic implications of deflationary renewable energy for coal power investments, CarbonTracker.org Report, 12 March 2020.

44 See footnote 3.