

Climate Risk and the Fossil Fuel Industry*

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Abstract

Burning coal, oil and natural gas is responsible for two-thirds of the world's emissions of greenhouse gases. These same fuels also represent the economic mainstay of resource-rich countries and the world's largest firms. Any steps humanity takes to reduce climate-warming emissions will damage commercial opportunities. Relief for the climate means danger for the fossil fuel business. Given the stakes, it bears asking: What, exactly, are the risks? How are they manifested and distributed? This article compiles emerging literature on climate risk and differentiates among risk types affecting fossil fuels, and also distinguishes among relative risk exposure levels for coal, oil and natural gas businesses. Categories of climate risk include “policy risk” or action by governments to reduce carbon emissions; “demand risk” or declines in demand due to climate factors; “divestment risk” due to shareholder activism; and “competition risk” or rivalry among producers seeking to monetize reserves before they are rendered unburnable. Finds are that the risk burden across the sector - for firms dealing in coal, oil, and natural gas - is not shared uniformly. While much of the focus has been on oil companies and countries harboring large oil reserves, the most damaging effects have fallen upon businesses based on coal. At the other end of the spectrum, the natural gas industry will continue to benefit from climate action.

Climate Risk and the Fossil Fuel Industry

Jim Krane

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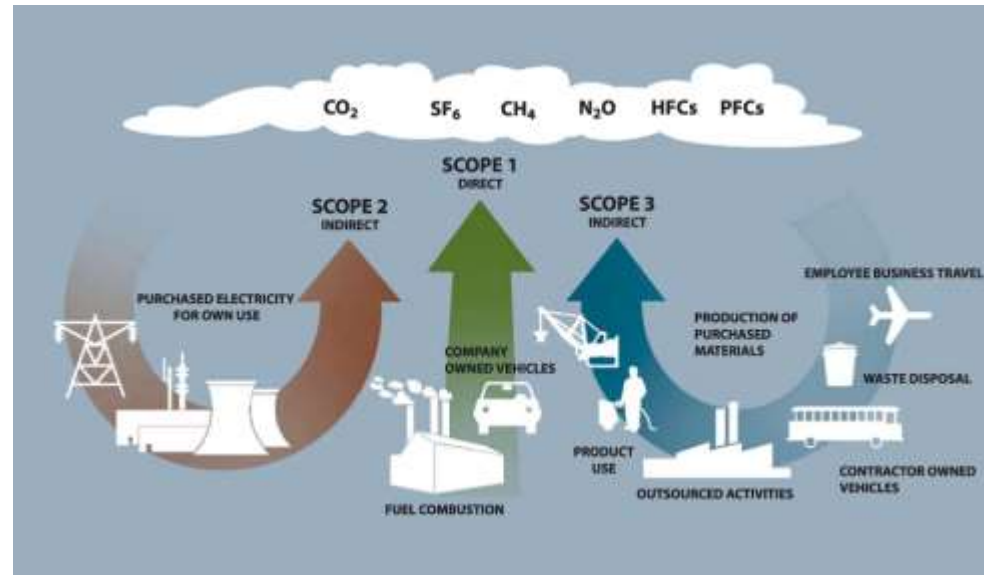


**AAPG conference, Houston
April 5, 2017**

**James A Baker III Institute for Public Policy
Rice University**

Basic assumptions

- Burning fossil fuel is responsible for 2/3 of human GHG emissions
- The same fuels provide the financial underpinning of resource-rich countries and world's largest firms
- Action on climate threatens the fossil fuel business
- What are the risks?
- How are they distributed?



What they say

Leave two-thirds of fossil fuels in the ground



“... take swift and unified action on climate.”

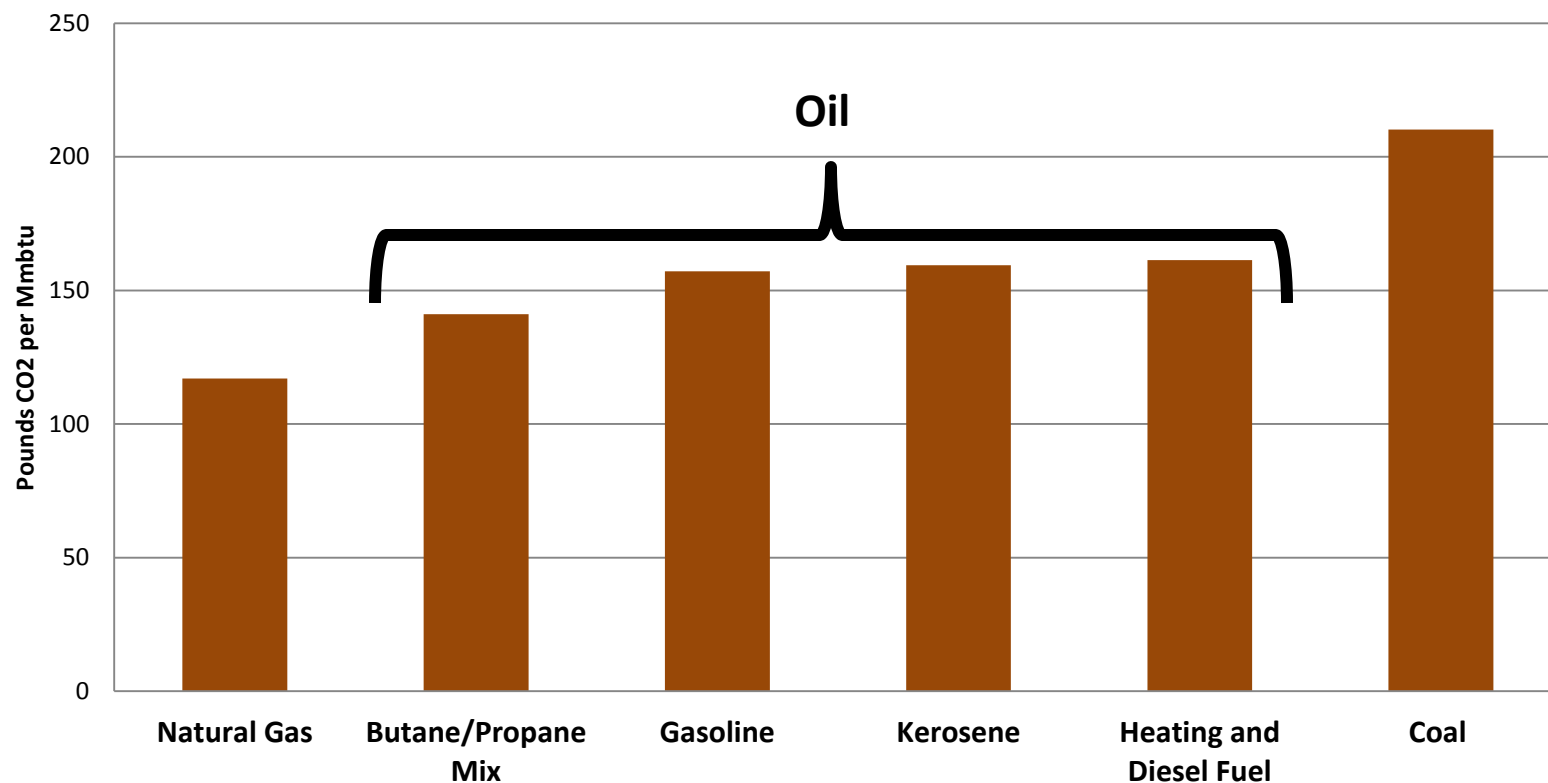


Main risk categories

- **Policy risk:** Government policies, regulations, and pledges
- **Financial risk:** Many types: *Divestment, insurance risk, lending risk, and stranded assets*
- **Legal risk:** Lawsuits based on liability for climate change
- **Geopolitical and Competition risk:** Rivalry for market share among producers seeking to monetize reserves before they are stranded
- **Demand risk:** Decline in fossil fuel demand due to climate

Carbon emitted relative to energy output

Carbon dioxide factors by fuel (EIA 2016)



Policy Risk

Government-imposed restrictions on fossil fuels, such as:

- Paris agreement pledges (INDCs)
- Carbon pricing or cap-and-trade schemes
- Gov't encouragement (subsidies) for non-fossil substitutes
 - EV incentives, efficiency standards
- Future: “Climate club” blocs could impose duties on imports from “free riding” countries



Financial Risk - divestment

- Pension funds, religious organizations, city governments, universities are selling off coal and oil co. shares, based on:
 - Ethical concerns: Companies profiting while damaging the climate
 - Financial concerns: Risk of stranded reserves
- Divestment *could* reduce funding availability and raise business costs.
 - One paper finds a 2.5% reduction in coal demand by 2030 as a result
 - Activist shareholder resolutions
- Investor tools/products that reduce carbon risk in portfolios
 - Bloomberg’s Carbon Risk Valuation Tool
 - FFI “fossil free indexes”



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Ticker	Fund Name	Fund Net Assets	Category	Flagged Holdings	% of Fund Flagged	tCO ₂ e/\$1M USD invested	SRI	5 Badges
PARWX	Parnassus Endeavor Investor	\$1,536,250,031	Large Growth	0	0%	25	✓	✓
CSIEX	Calvert Equity A	\$2,296,185,363	Large Growth	0	0%	24	✓	✓
PARNX	Parnassus	\$765,168,074	Large Growth	0	0%	93	✓	✓
PHO	PowerShares Water Resources ETF	\$709,339,510	Miscellaneous Sector	0	0%	64	✓	✓
ALTFX	AB Global Thematic Growth A	\$625,863,072	World Stock	0	0%	13	✓	✓
CEYIX	Calvert Equity I	\$2,296,185,363	Large Growth	0	0%	24	✓	✓
PORTX	Portfolio 21 Global Equity R	\$444,710,267	World Stock	0	0%	45	✓	✓
BAWAX	Brown Advisory Sustainable Growth Adv	\$344,543,792	Large Growth	0	0%	29	✓	✓
CIEYX	Calvert Equity Y	\$2,296,185,363	Large Growth	0	0%	24	✓	✓
GCBLX	Green Century Balanced	\$185,345,745	Allocation--70% to 85% Equity	0	0%	56	✓	✓

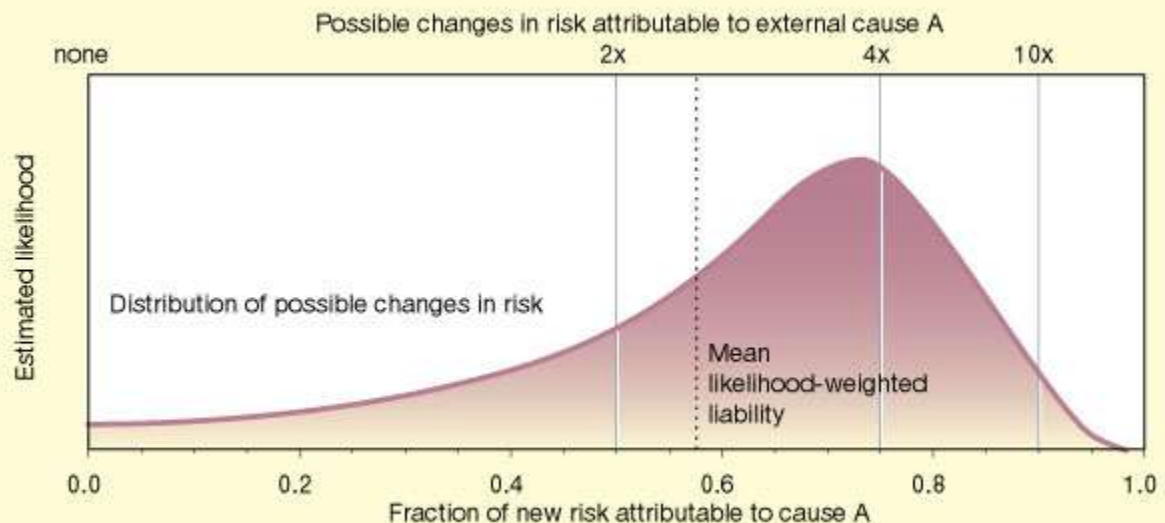
Financial Risk II

- **Insurance risk:** Big financial stake in climate progress
 - Some are divesting : AXA shift coal assets into “green” assets
 - Could insurers make trouble?
- **Lending risk:** Big banks refuse to lend to coal
 - Citigroup “risk review” for oil sands loans
- **Stranded Asset risk** - aka “carbon bubble”
 - Market caps exaggerated because firms will be prevented from producing booked reserves
 - NOCs are exempt from valuation issues, but risk stranded reserves
- Stranded reserves in 2^o scenario (McGlade & Ekins 2015)
 - **COAL: 80% unburnable**; worth \$60 trillion (Citi estimate)
 - **GAS: 50% unburnable**; \$23 trillion
 - **OIL: 33% unburnable**; \$30 trillion

Legal Risk

- Legal scholars argue that fossil fuel companies or governments can be held liable for property damage or rising insurance claims
 - One suit by a group of US citizens is proceeding through US courts
 - In the absence of direct evidence, litigation could be based on “mean likelihood-weighted liability” that an industry’s activity exacerbated climate damage

Mean likelihood-weighted liability is an average of all possibilities consistent with currently available information (Allen 2003)



Geopolitical Risk

- Intensified competition among energy producing states
 - **Green Paradox** could incentivize short-term production and competition among countries for market share
 - Restrictions intensifying over time make fossil fuel more attractive
 - Perverse result: Regs encourage even more FF consumption
- Reduced role for FFs could disrupt international relations
 - Diminished strategic importance of petro-states
 - Demise of the Carter Doctrine?
- Persistent oversupply could devolve into quest to shut down a rival country's production – (subversion?)



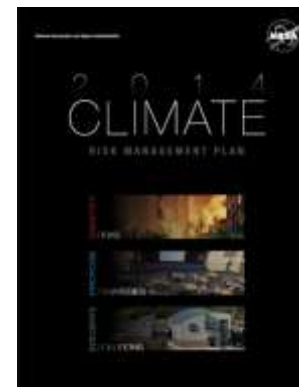
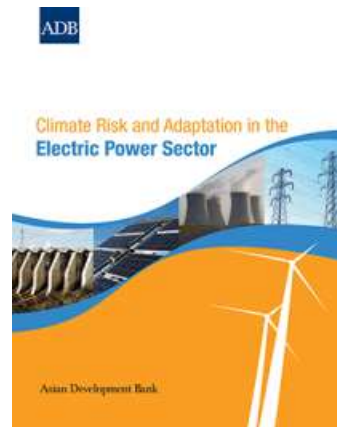
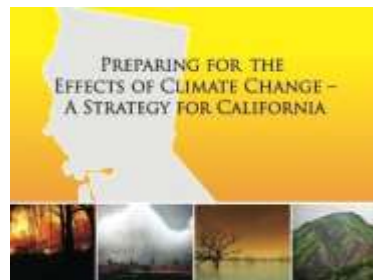
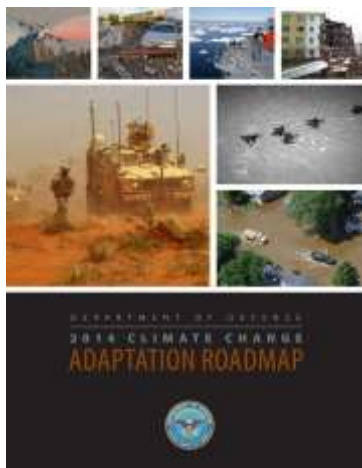
Demand Risk

Coming “peak demand” point for fossil fuels

- Maturing economies, retiring capital equipment, improvements in non-carbon substitutes
- Coal: Demand may have already peaked
 - But: Coal still competitive on cost and simplicity
- Gas: The “bridge” to decarbonization as coal substitute
 - Long-term growth story, surpassing coal in US now, globally 2030
 - But: Plenty of substitutes for gas
- *Alt story: BNEF – fossil generation peaks in 2025, chased out by cheap renewables and battery storage*
- Oil: Peak between 2025-50
 - No viable substitutes
 - Electric vehicles face major tech, cost and policy hurdles

Conclusion

- Sector responsible for 68% of GHG will come under pressure
- Coal bearing the brunt. O&G next?
- Risks increase as climate progress increases
- Without a technical breakthrough, it's a zero-sum game
 - Paris commitments conflict with exploration and booking of reserves
- Cos. can “future proof” business models to reduce exposure
- Some may change strategic direction



Thank you!

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