Managing the ‘Zombie Well Apocalypse’ and Orphan Wells

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Forging insight for oil and gas companies to succeed in a changing energy landscape

COPAS San Antonio
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San Antonio

HOUSTON CHRONICLE

BUSINESS // ENERGY

Zombie Wells, Part 1: Texas oil wells are leaking toxic waste, and no one wants to pay to clean it

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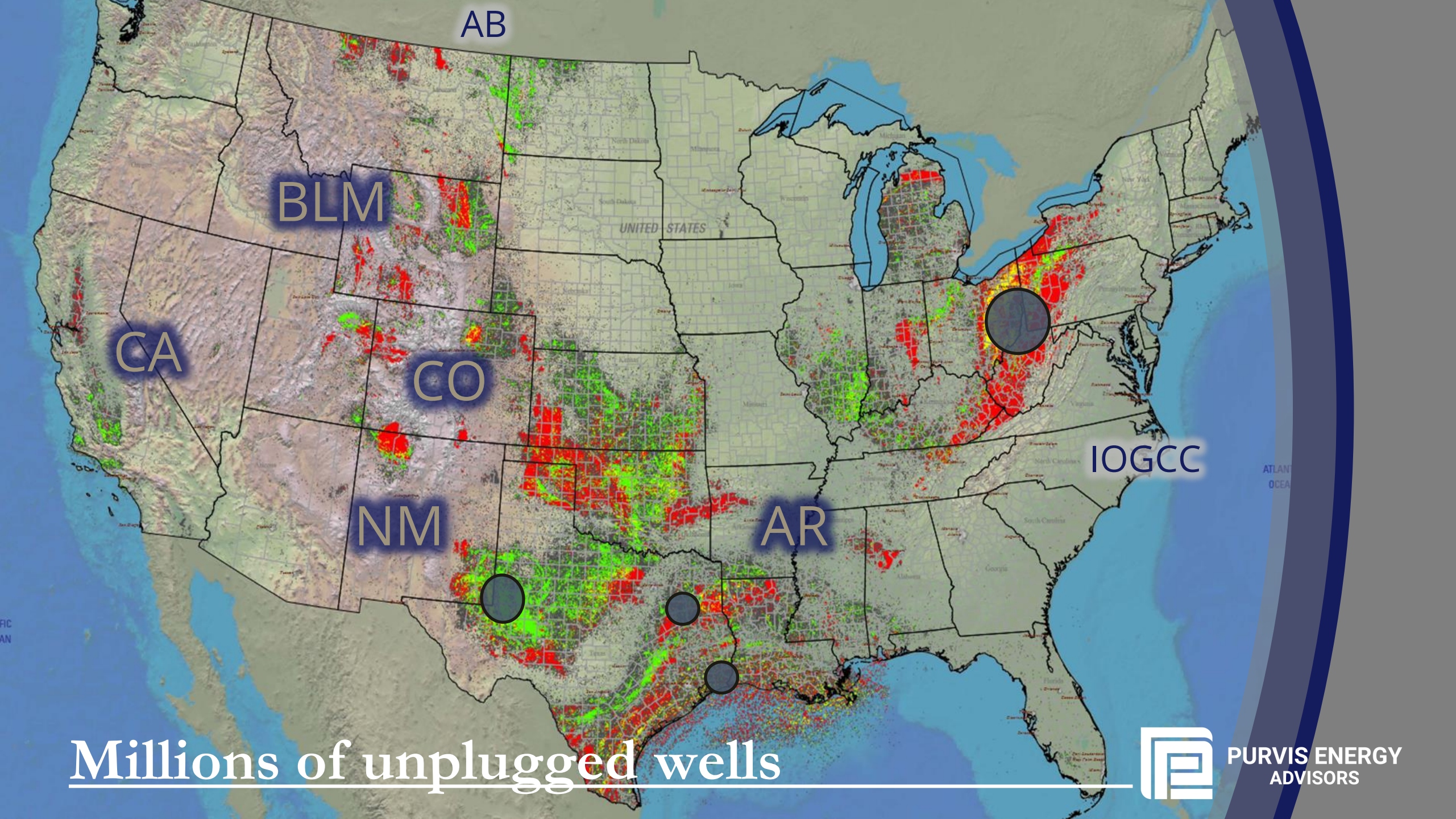

Millions of unplugged wells

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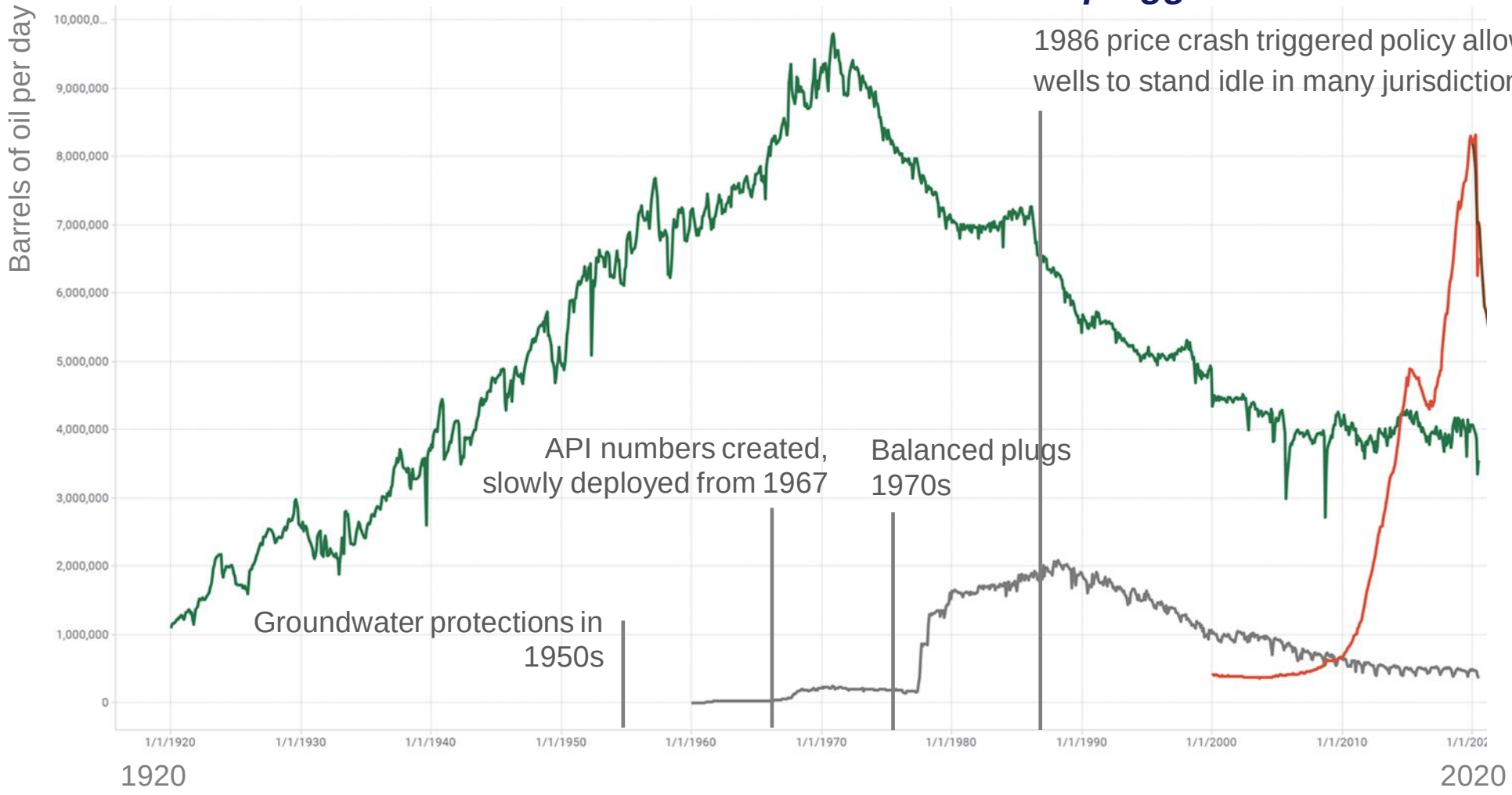
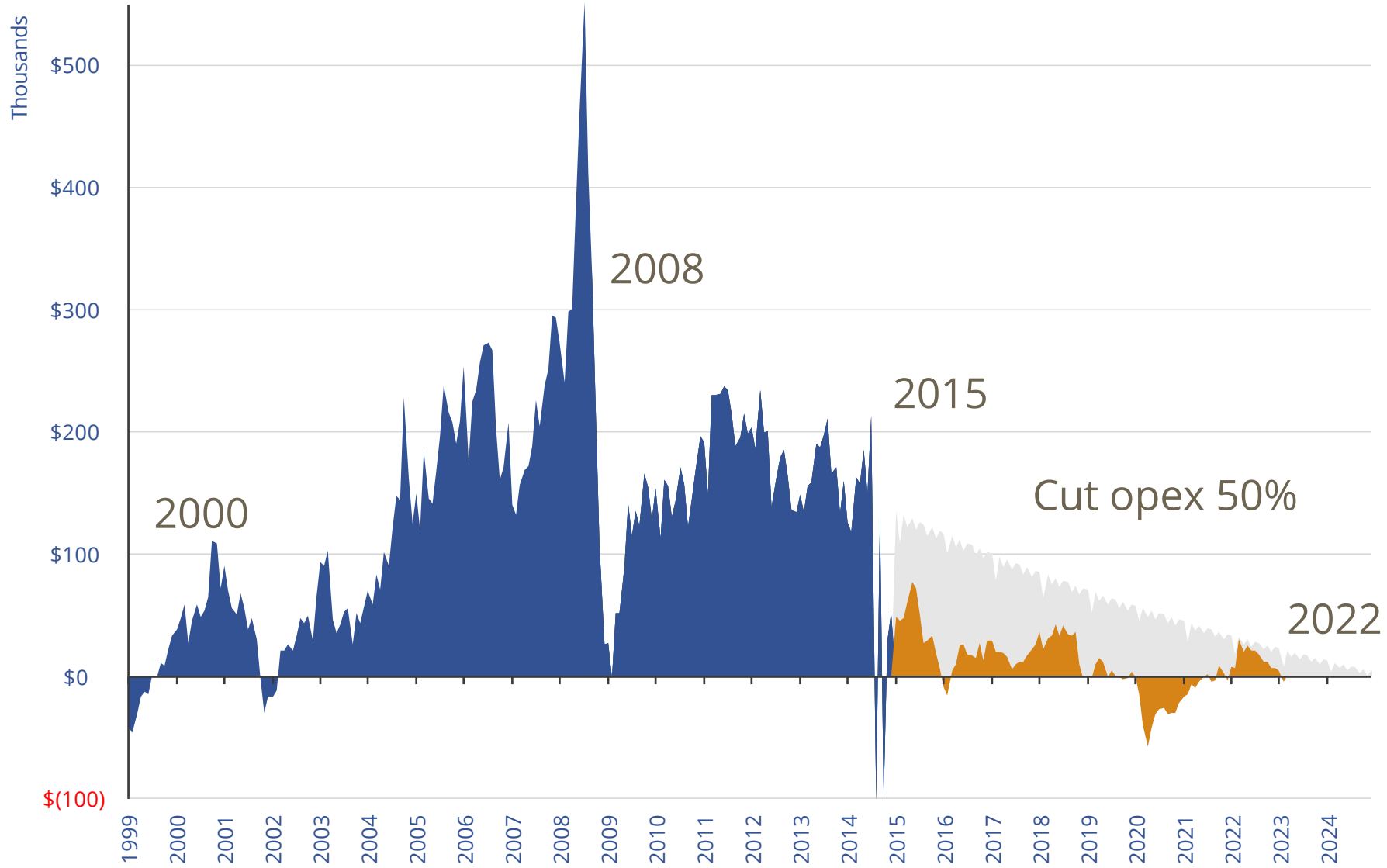
Regulatory regimes evolved

Average age of known, unplugged wells in U.S. ~37 years

1986 price crash triggered policy allowing wells to stand idle in many jurisdictions



Cash flow roller-coaster, example field



Retirement is more than plugging

Downhole	Surface	
Plugging (planned ops)	**Removal** (wells, batteries, and central)	**Restoration** (pads, facilities, roads)
Salvage	Salvage	

Unplanned	Unplanned Remediation

Total cost is often multiples of planned, downhole costs.
PLUS. . .

Future	Future

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Production is split

BOE per day (last 12 mos)	Well count	Share of well count	Share of production
Idle	1,483,997	59%	0%
Active injection/service wells	79,548	6%	0%
Less than 1	317,566	13%	0.4%
1 to 15	338,818	14%	8%
15 to 50	101,727	4%	13%
Greater than 50	76,263	3%	79%
TOTAL	2,397,919		

TOP

7% of wells make
92% of production

Hand-me-down sales
Ownership split

BOTTOM

72% of wells make
0.4% of production

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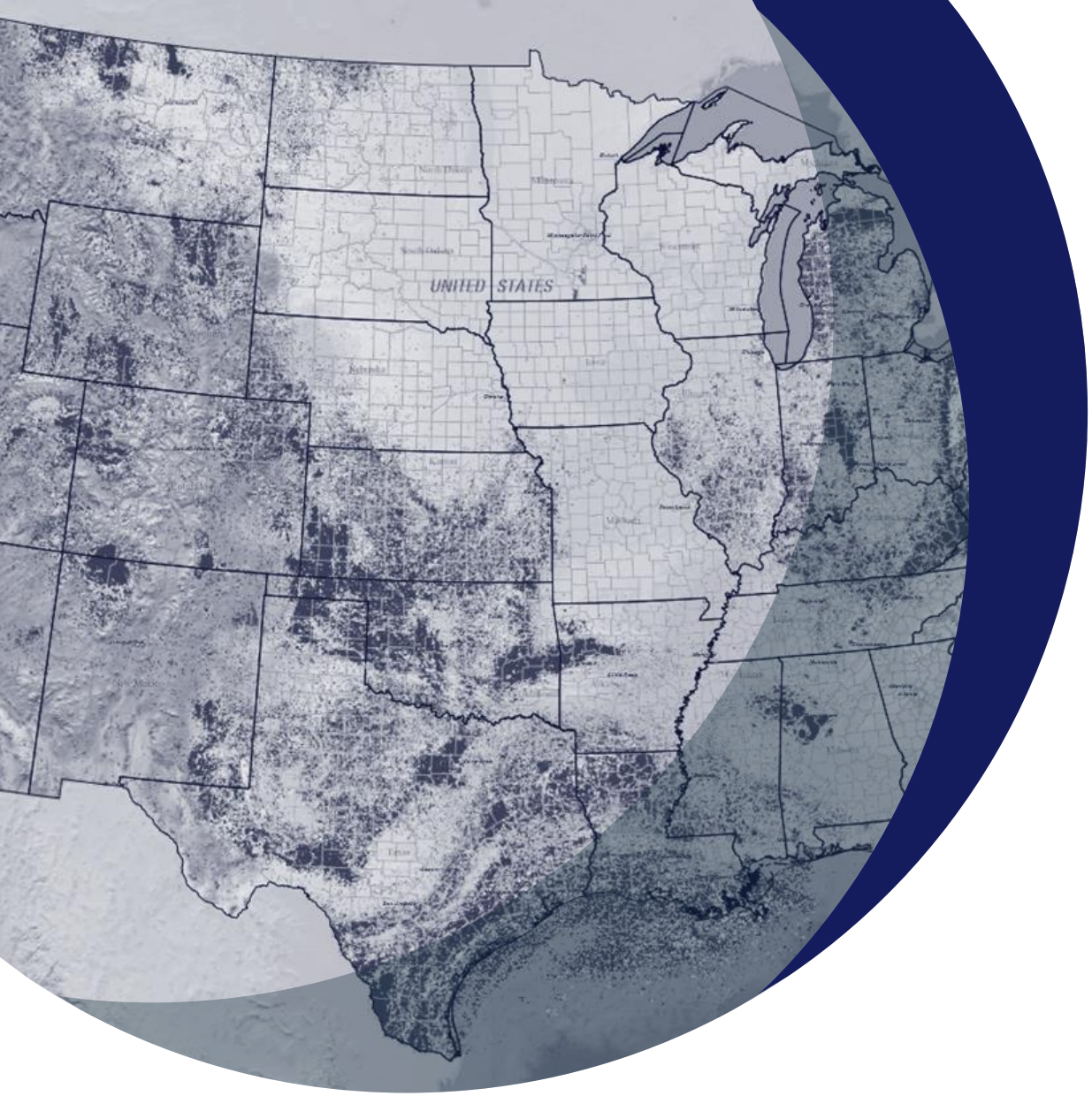

Liabilities can exceed total future net cash flow

even while cash flow remains strong and NPV remains positive

Deferring retirement creates a **two-sided trap**

as assets deplete and diminish while liabilities accumulate and expand

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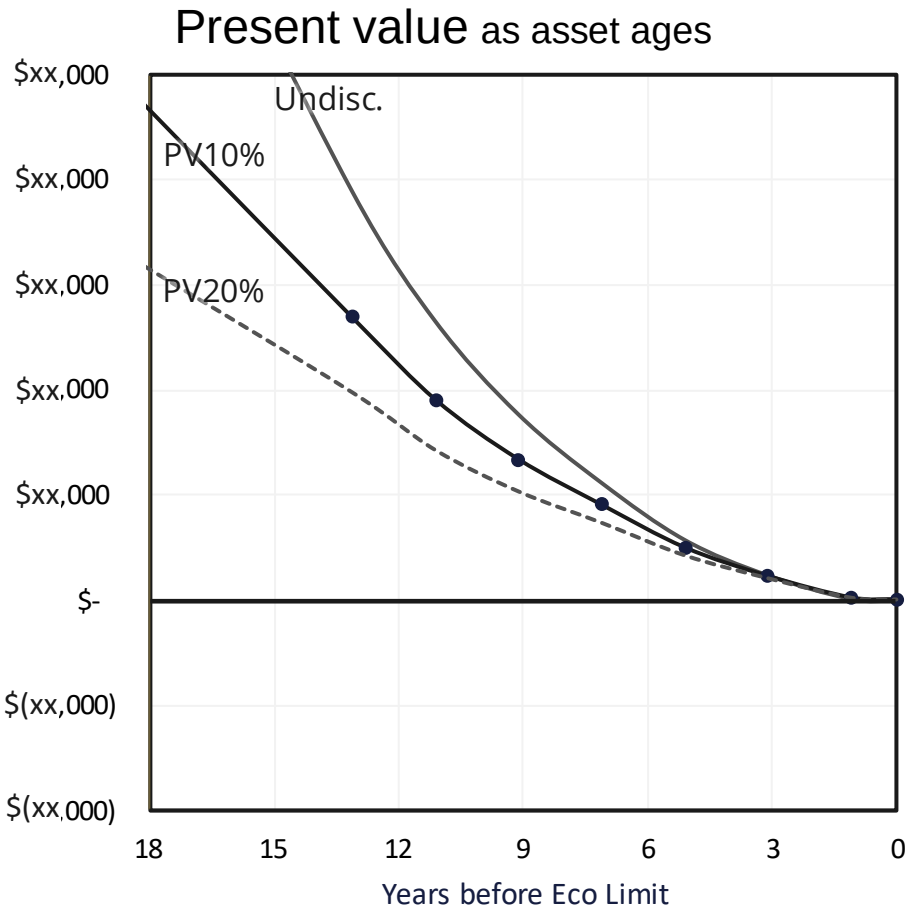
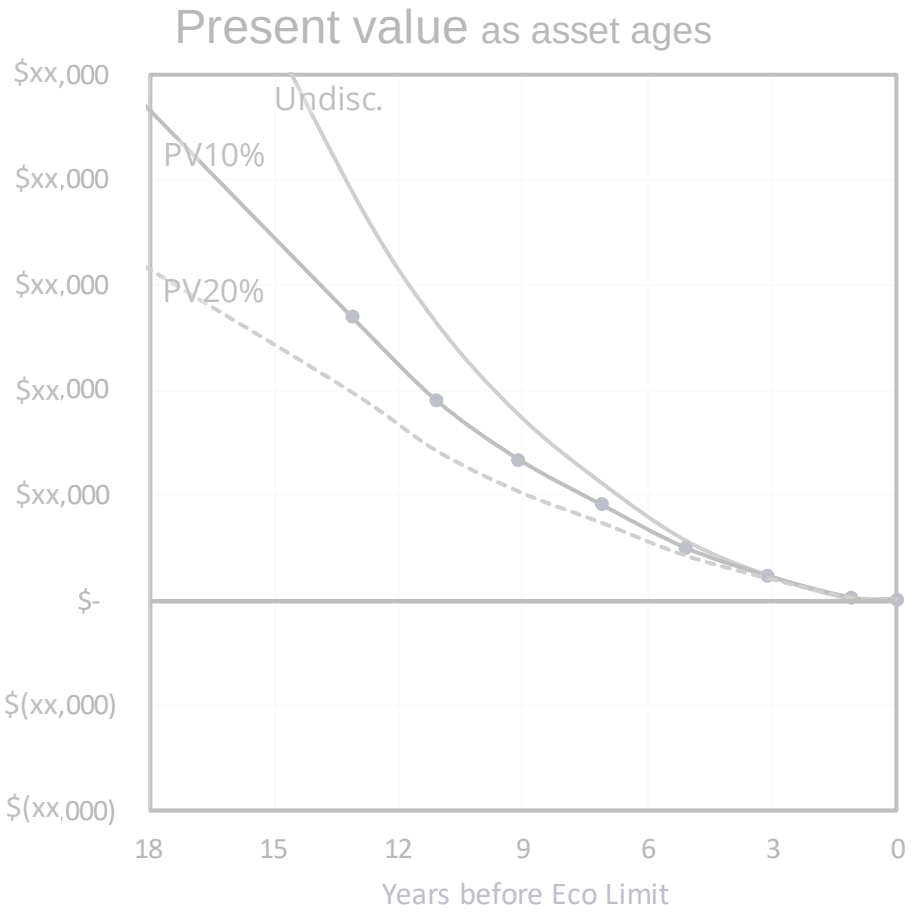
What we expect. . .

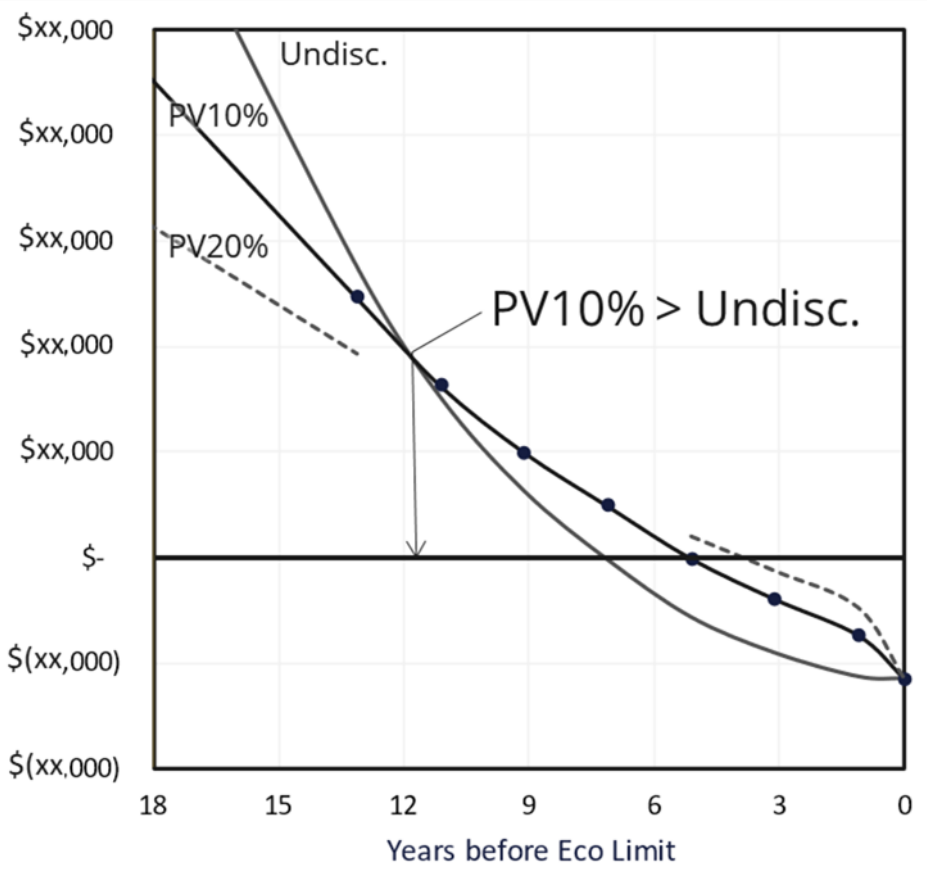


True if ADRs excluded, and
mostly true if paid during economic life.

. . .is not what happens



Present value no longer makes economic sense



Years before Eco Limit	Ratio of PVs Wells idle 0%
20	196.8
19	161.1
18	131.2
17	106.3
16	85.6
15	68.5
14	54.4
13	42.8
12	33.4
11	25.7
10	19.5
9	14.5
8	10.6
7	7.5
6	5.2
5	3.4
4	2.1
3	1.1
2	0.5
1	0.2
Eco Limit	0.0

Cash flow pinches
Present value inverts

Years before Eco Limit	Ratio of PVs Wells idle 0%	Ratio of Undisc. 0%
20	196.8	5.3
19	161.1	4.9
18	131.2	4.5
17	106.3	4.1
16	85.6	3.8
15	68.5	3.4
14	54.4	3.1
13	42.8	2.8
12	33.4	2.5
11	25.7	2.2
10	19.5	2.0
9	14.5	1.7
8	10.6	1.5
7	7.5	1.3
6	5.2	1.1
5	3.4	0.9
4	2.1	0.7
3	1.1	0.5
2	0.5	0.3
1	0.2	0.2
Eco Limit	0.0	0.0

Red fill mc

Coverage ratio is much lower

Undiscounted value inverts earlier

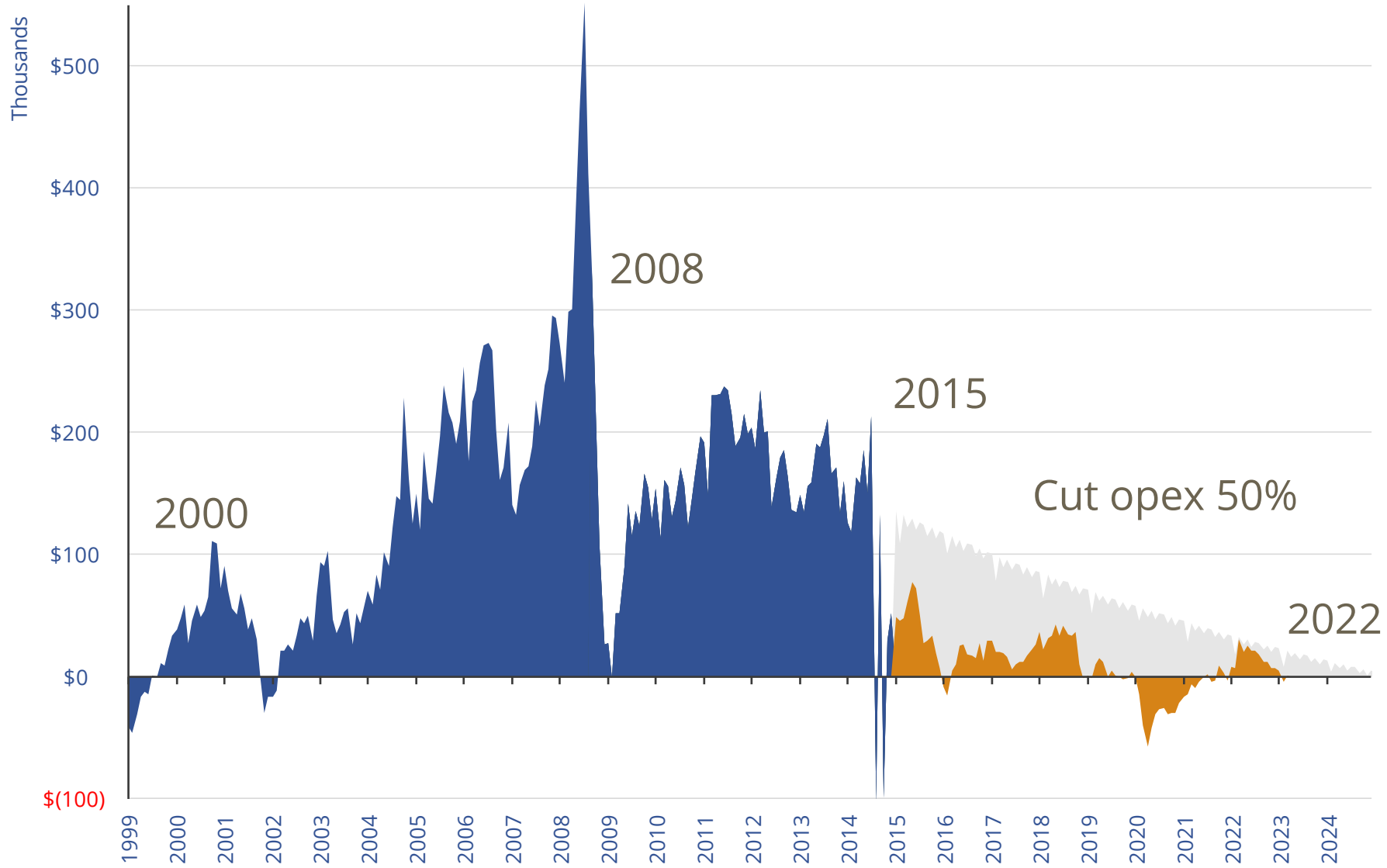
Years before Eco Limit	Ratio of PVs Wells idle 0%	Ratio of CFs Wells idle 0%	50%	67%	75%	83%	90%	95%
20	196.8	5.3	2.6	1.8	1.3	0.9	0.5	0.3
19	161.1	4.9	2.4	1.6	1.2	0.8	0.5	0.2
18	131.2	4.5	2.2	1.5	1.1	0.7	0.4	0.2
17	106.3	4.1	2.1	1.4	1.0	0.7	0.4	0.2
16	85.6	3.8	1.9	1.3	0.9	0.6	0.4	0.2
15	68.5	3.4	1.7	1.1	0.8	0.6	0.3	0.2
14	54.4	3.1	1.6	1.0	0.8	0.5	0.3	0.2
13	42.8	2.8	1.4	0.9	0.7	0.5	0.3	0.1
12	33.4	2.5	1.3	0.8	0.6	0.4	0.3	0.1
11	25.7	2.2	1.1	0.7	0.6	0.4	0.2	0.1
10	19.5	2.0	1.0	0.7	0.5	0.3	0.2	0.1
9	14.5	1.7	0.9	0.6	0.5	0.3	0.2	0.1
8	10.6	1.5	0.8	0.5	0.4	0.3	0.2	0.1
7	7.5	1.3	0.6	0.4	0.3	0.2	0.1	0.1
6	5.2	1.1	0.5	0.4	0.3	0.2	0.1	0.1
5	3.4	0.9	0.4	0.3	0.2	0.1	0.1	0.0
4	2.1	0.7	0.3	0.2	0.2	0.1	0.1	0.0
3	1.1	0.5	0.2	0.2	0.1	0.1	0.0	0.0
2	0.5	0.3	0.2	0.1	0.1	0.1	0.0	0.0
1	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0
Eco Limit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Red fill marks years when P&A liability exceeds future net income

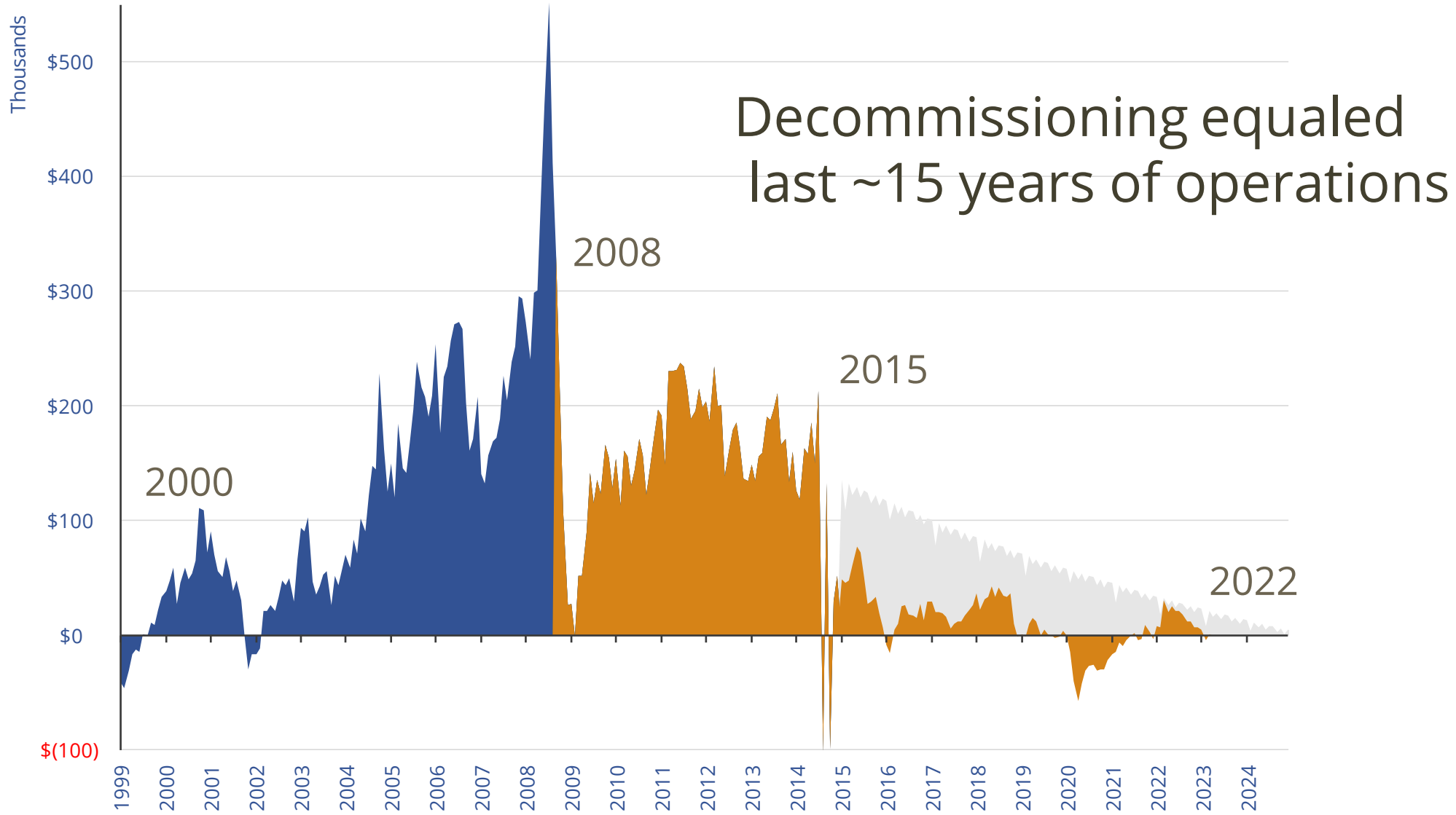
Some assets will require all cash flow for final 10-15 years

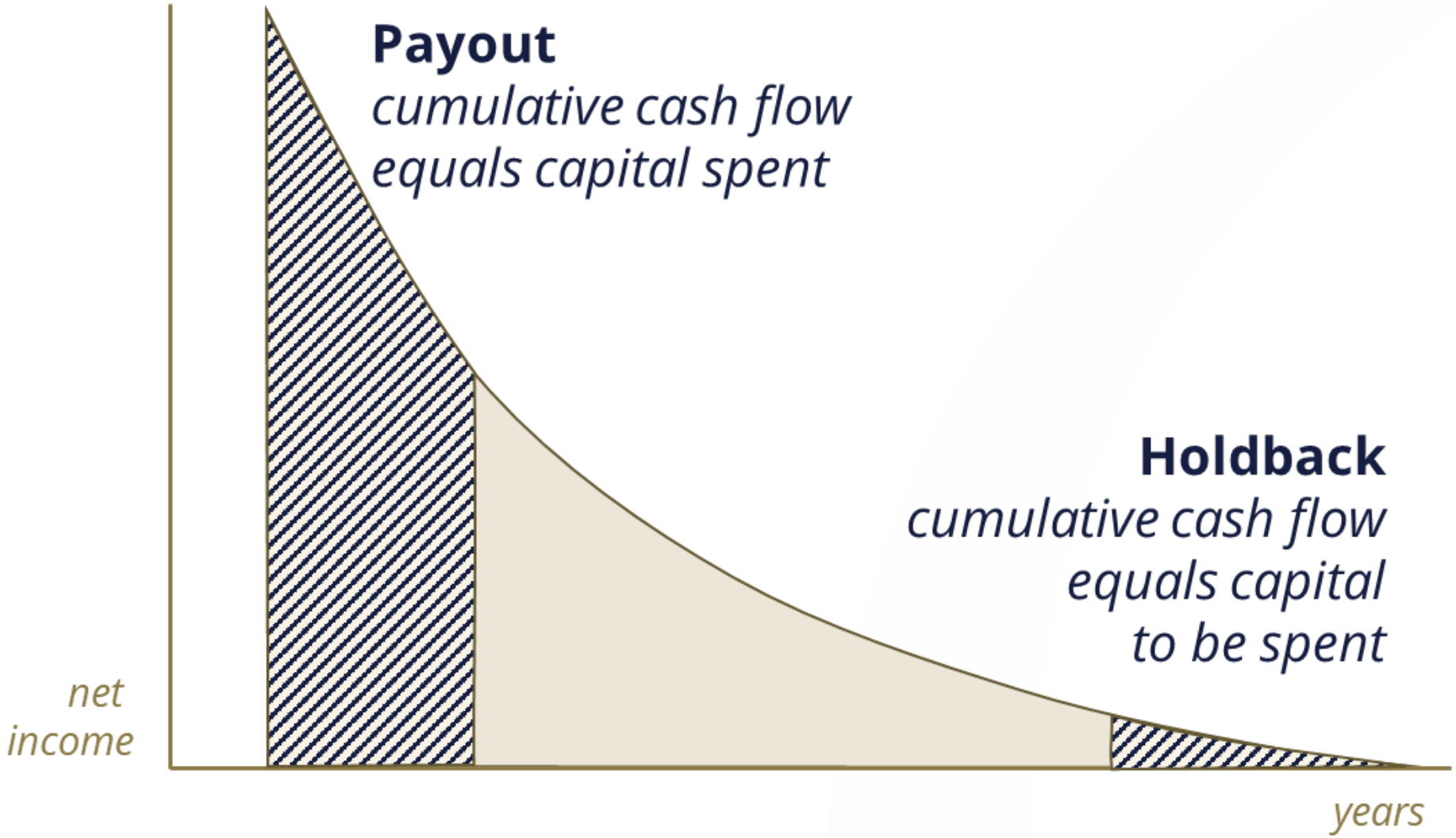
Deferrals accelerate inversion

Cash flow roller-coaster, example field



Long “holdback” period even with high prices





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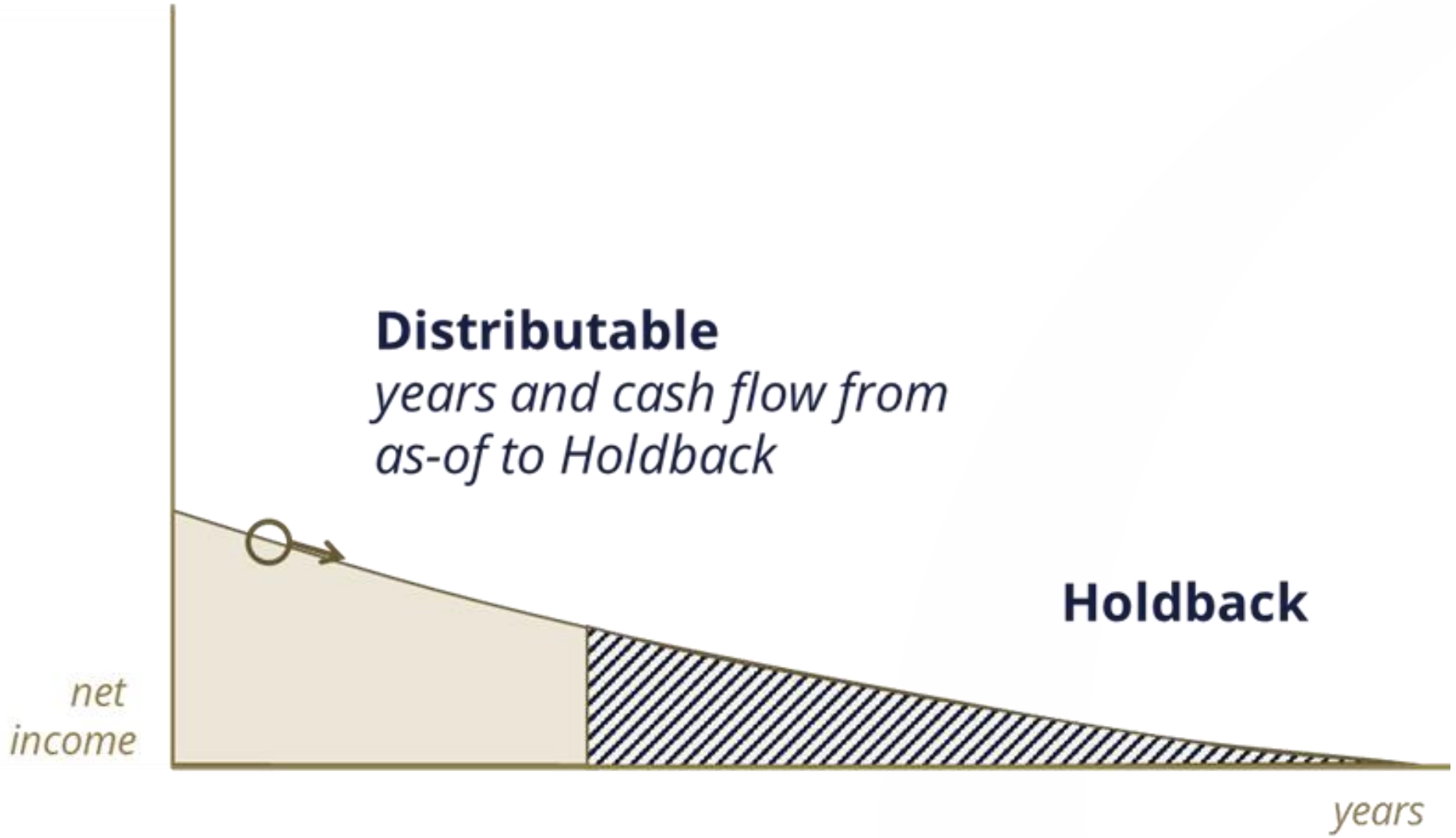

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Other terms better describe uncertainty

Holdback	deterministic	time when future net revenue (FNR) is less than or equal to AROs
Distributable Life		from present to start of Holdback
Holdback Coverage	adds safety margin	*ratio* of FNR to AROs
Discounted Holdback	adds risk	time when *discounted* FNR is less than or equal to AROs
Discounted Holdback Coverage	adds both risk and safety margin	*ratio* of *discounted* FNR to undiscounted AROs

So. . .

Calculate end-of-life economic yardsticks
like holdback

Talk with non-ops about funding
so you are not left holding the bag alone

Change accounting and audit practices
to examine end-of-life liquidity

Thank you.

Questions? Ideas?

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