A 2007 TALK, RE-RUN WITH 2026 DATA

Preventing global climate collapse

Is it still possible? What has changed, what the 2007 talk got wrong, and whether Carbon Bonds still add up.

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The planet kept warming. Emissions stopped growing so fast.

1.43 °C

Global temperature in 2025 above 1850–1900. 2024 was 1.55 °C, the first year above 1.5 °C.

58.4 Gt

Total greenhouse gas emissions in 2025 (CO2e). Still a record, but roughly flat on 2024.

0.3%/yr

Growth in total CO2 over 2016–2025, down from 1.7%/yr over 2006–2015.

~4 yrs

The remaining 1.5 °C budget (130–150 GtCO2) at current emissions.

Sources: WMO State of the Global Climate 2025 (23 Mar 2026); UNEP Emissions Gap Report 2026 (21 Oct 2026); Global Carbon Budget 2026 (preprint, 10 Nov 2026); Forster et al. 2026, ESSD 18:3889.

Still the problem of the 21st century

2007 talk said	2026 evidence
Climate change is faster	Right. 0.27 °C per decade; human-caused warming 1.37 °C, 1.5 °C around 2030.
Emissions above the worst case	Wrong. A record 58 Gt CO2e, but well below the A1FI worst case.
Arctic ice melting	Right. The 20 lowest September minima are all 2007–2026.
Amazon burning down	Partly. South-east Amazonia is a net source; 2024 fires emitted ~0.8 GtCO2.
Permafrost methane release	Real but slow. Methane growth fell from ~17 ppb (2021) to 4.8 ppb (2025).
Zero action	Wrong now. Paris, cheap solar, wind and batteries, but still a ~2.8 °C path.

Sources: Forster et al. 2026, ESSD 18:3889; NASA (7 Oct 2026); Gatti et al. 2021, Nature 595:388; Biogeosciences 22:5247 (2025); NOAA GML; UNEP Emissions Gap Report 2026.

The worst case, not the forecast

2007 talk said	2026 evidence
6–10 °C temperature rise	~2.8 °C by 2100 on current policies; 2.1 °C if every pledge is met.
Sea level rises 100 m	Both ice sheets hold ~65 m, lost over centuries. By 2100: ~0.6–1.0 m (high case).
Antarctic and Greenland ice caps melt	Over centuries. Tipping thresholds may lie at 1.5–2 °C.
Oceans turn acid	Surface pH 8.2 → 8.1; a further 0.1–0.4 by 2100. More acidic, still alkaline.
+90% extinction rate	~1 million of ~8 million species threatened (IPBES 2019).
No plant life between the tropics	No evidence. The risk is heat stress on people and degraded forests.

Sources: UNEP Emissions Gap Report 2026; IPCC AR6 Synthesis Report; Armstrong McKay et al. 2022, Science 377:eabn7950; IPBES 2019; García-Soto et al. 2021, Front Mar Sci 8:642372; Kwiatkowski et al. 2020, Biogeosciences 17:3439.

We missed the worst case, and the safe path too

Path (Gt CO2e a year)	2020 in the talk	2025 in the talk	2025 actual
IPCC SRES A1FI (worst case)	~59	~68	58.4
Stern Review 550 ppm CO2e	~52	~51	58.4
IPCC SRES B2 (middle)	~45	~46	58.4

GOOD NEWS

Actual emissions are about 10 Gt a year below the A1FI path the 2007 model costed.

BAD NEWS

They are about 7 Gt above the Stern 550 path, which had emissions falling by now.

Talk values read off the 2007 chart (2025 interpolated); units assumed to be Gt CO2e. Actual: UNEP Emissions Gap Report 2026.

SIMPLE ANSWER

Money

COMPLEX ANSWER

Still money

But the amount of money involved has changed a lot since 2007.

The gap between cost and willingness has shrunk

	2007 talk	2026
Cost to abate	US$50–500 per t “C equiv.”	≤US$100/tCO2e could halve emissions by 2030; most of that ≤US$20
Australian emissions per person	~20 t	16.4 t (18.2 t without land use)
Cost per person per year	$2,000–20,000	~US$390–1,870 (95% cut at US$25–120/t)
Willingness to pay	$120 a year	69% say they would give 1% of income
Cost as share of world GDP	Not stated	~0.6–2.9% at peak (2050) in my model

Sources: IPCC AR6 WGIII SPM C.12.1 (2022); DCCEEW quarterly update, year to Mar 2026; Andre et al. 2024, Nat Clim Change 14:253. 2007 figure: median US$135 per household across 27 studies (Johnson & Nemet 2010).

The oil numbers were out by a factor of 70

	2007 talk	2026
Oil extracted to date	100 trillion barrels since 1860	~1.7 trillion barrels (1.25T by 2011, plus since)
Still to extract in 40 years	100 trillion barrels	~1.5 trillion at ~100 million bbl a day
Proved reserves	Not stated	~1.57 trillion barrels (OPEC, end 2024)
Value at risk from climate action	$50T with no action, <$10T with action	US$1–4T of stranded fossil wealth; >US$1T upstream oil and gas

Why it matters: if the stranded value is a few trillion dollars, a Carbon Bank could simply buy out the incumbents. That is cheap next to the cost of the transition itself.

Sources: Miller & Sorrell 2014, Phil Trans R Soc A 372:20130179; OPEC Annual Statistical Bulletin 2025; Energy Institute Statistical Review 2026; Mercure et al. 2018, Nat Clim Change 8:588; Semieniuk et al. 2022, Nat Clim Change 12:532.

The replacement has already started

57%

Fossil share of world electricity in 2025, not 98%. Renewables (33.8%) passed coal (33.0%) for the first time.

2 : 1

Clean energy investment against fossil in 2025: ~US$2.2T against ~US$1.1T.

-90%

Fall in utility solar cost since 2010 (US$0.417 to US$0.043/kWh). Onshore wind −70%; batteries −93%.

Cost to replace	2007 talk	2026
Total	US$10–200T	~US$275T of all energy and land spending 2021–2050; ~US$3.5T/yr above 2020 (gross)
In years of world GDP	0.5–10 years	0.09–1.7 years (US$117T GDP); the 2007 maths gave 0.18–3.5

Sources: Ember Global Electricity Review 2026; IEA World Energy Investment 2025; IRENA Renewable Power Generation Costs in 2024; BNEF (9 Dec 2025); McKinsey (Jan 2022). Fossil fuels are still ~86% of total energy supply (Energy Institute 2026).

Still the hardest part

Country	2007 talk	2026	Share of fossil CO2
USA	Out until ?	Left Paris on 27 Jan 2026; announced exit from the UNFCCC on 7 Jan 2026	~13%
China	Out until after 2050	2035 pledge: 7–10% below peak; neutral by 2060; CO2 flat since early 2024	~32%
India	Out	2035 pledge: 47% cut in emissions intensity on 2005; net zero 2070	~8%
Together	75% of future emissions	53% of today's emissions; no source found for 75%	~53%

No country wants to pay unless everyone pays. That has not changed, and the US has now left.

Sources: Global Carbon Budget 2025 (shares, preliminary); Carbon Brief (2 Sep 2026, CREA analysis); UNFCCC NDC registry; Carbon Brief Q&A on the US memorandum of 7 Jan 2026. COP31, Antalya, is running now (9–20 Nov 2026).

Three of the five conditions look easier than in 2007

Condition	2026 status
Close the gap between cost and willingness to pay	Easier: from >90% to small, or none at the median cost
Overcome vested interests	Easier: stranded value is US$1–4T, small enough to buy out
Replace current infrastructure	Easier: clean investment already runs 2 : 1 over fossil
All countries agree	Harder: the US has left Paris; China and India have targets
Done within 10 years	Mixed: 1.5 °C is effectively gone (~4 years left); 2 °C allows ~24 years

Is there any hope? More than in 2007. The problem is now mostly political.

Push the cost on to future generations

WHY (2007, STILL TRUE)

- They receive most of the benefits
- They will be richer: world GDP at least doubles by 2050
- They can’t say no

WHAT 2026 ADDS

- Bonds move who pays, not what is built: the steel and labour are used now
- When real interest rates exceed growth, deferring costs more as a share of GDP

GDP doubling: IPCC AR6 WGIII SPM C.12.2 (2022). Real rates: US 30-year TIPS 3.24% on 12 Nov 2026 (FRED DFII30).

How it works

1 · FOUND

A small group of countries set up a new bank, the Carbon Bank, and underwrite its debt.

2 · BORROW

The bank issues 50-year, sovereign-backed, inflation-indexed, zero-coupon Carbon Bonds.

3 · SPEND

Proceeds buy and close emitting assets and build zero-emission infrastructure.

4 · SHARE

At maturity each member pays by its share of world GDP, with a discount for joining early.

Nobody has to agree today on who pays. Later joiners take a negotiated share of the debt.

The price depends entirely on real interest rates

A zero-coupon bond pays no interest. It sells at a discount and repays its face value at maturity. For a 50-year bond the price is 1 ÷ (1 + r)^50.

The 2007 talk said 2.2% real gives ~30% of face. It actually gives 34%; the model used 2.5%, which gives 29%.

Real yield	Price	Repay ×
1.84% (Sep 2024 low)	40%	2.5
2.2% (2007 talk)	34%	3.0
2.5% (2007 model)	29%	3.4
3.24% (12 Nov 2026)	20%	4.9

At today's rates each dollar raised costs nearly five dollars, in real terms, to repay in 2076.

US 30-year TIPS real yield (FRED series DFII30). 2026 range to 12 Nov: 2.43–3.37%. Repay × = (1 + r)^50.

Re-running the model with 2026 numbers

	2007 model	2026 model
Emissions baseline	Worst case (IPCC A1FI), rising to ~126 Gt	Flat at 58 Gt CO2e a year (current plateau)
Cut	95%	95% by 2050, straight line from 2027
Cost of abatement	Anderson 2006, high and low	US$25 / 60 / 120 per t CO2e average, flat in real terms
World GDP growth	3.90% to 2050; 2.35% to 2100	2.7% to 2050; 2.0% after
Bonds	2.5% real, 50 years	1.8% / 2.5% / 3.25% real, 50 years
Money	US$ 2000	US$ 2025; world GDP US$117T
Programme	2020–2100	2027–2100 (or build-out to 2050 only), repaid 50 years later

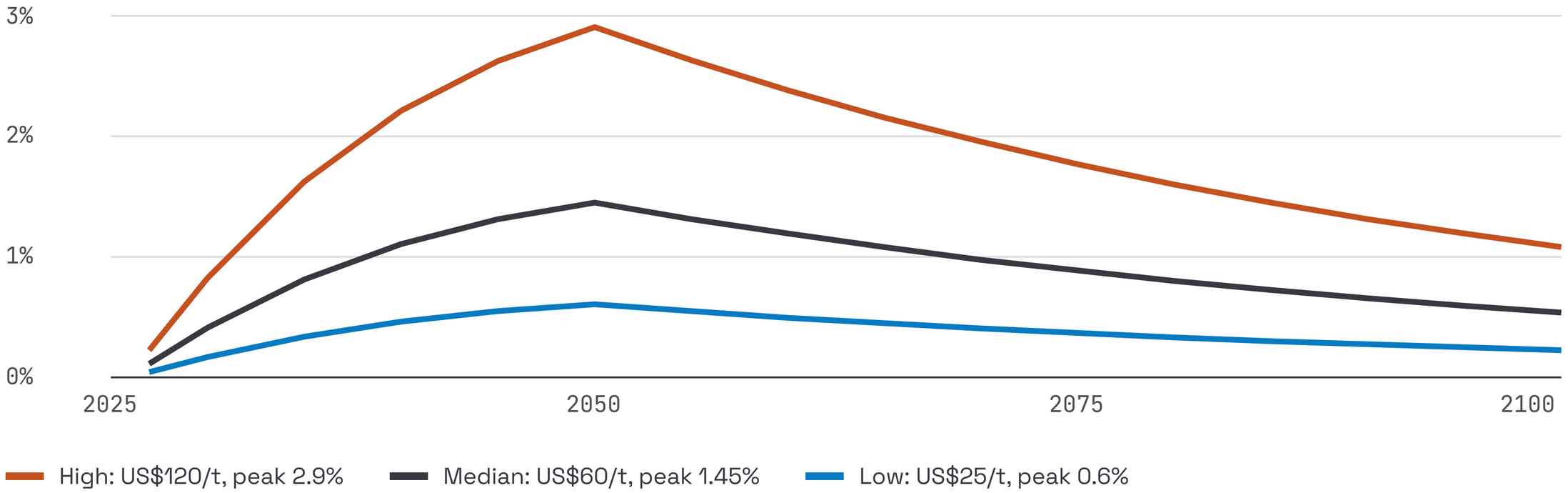
Cost cases anchored on IPCC AR6 WGIII SPM C.12.1. GDP: IMF WEO Oct 2025. Model code and outputs available on request.

Seven errors, one of them serious

#	2007 slide	Check
1	20 t × $50–500 = $2,000–20,000	$1,000–10,000; and $273–2,727 if the cost is per t of carbon
2	100 trillion barrels of oil	~1.5 trillion: a slip for 100 million barrels a day
3	$10–200T = 0.5–10 years of world GDP	0.18–3.5 years of 2007 GDP
4	2.2% real gives ~30% of face	34%; the model used 2.5% (29%)
5	GDP grows 3.9% a year to 2050	The model's own GDP grew ~2.4–2.5%
6	US, China, India = 75% of future emissions	53% of today's; no source for 75%
7	**Repayment peaks at 1.27% of GDP (2100)**	**~4.5–4.8%: the cost chart is the spend chart × 0.29**

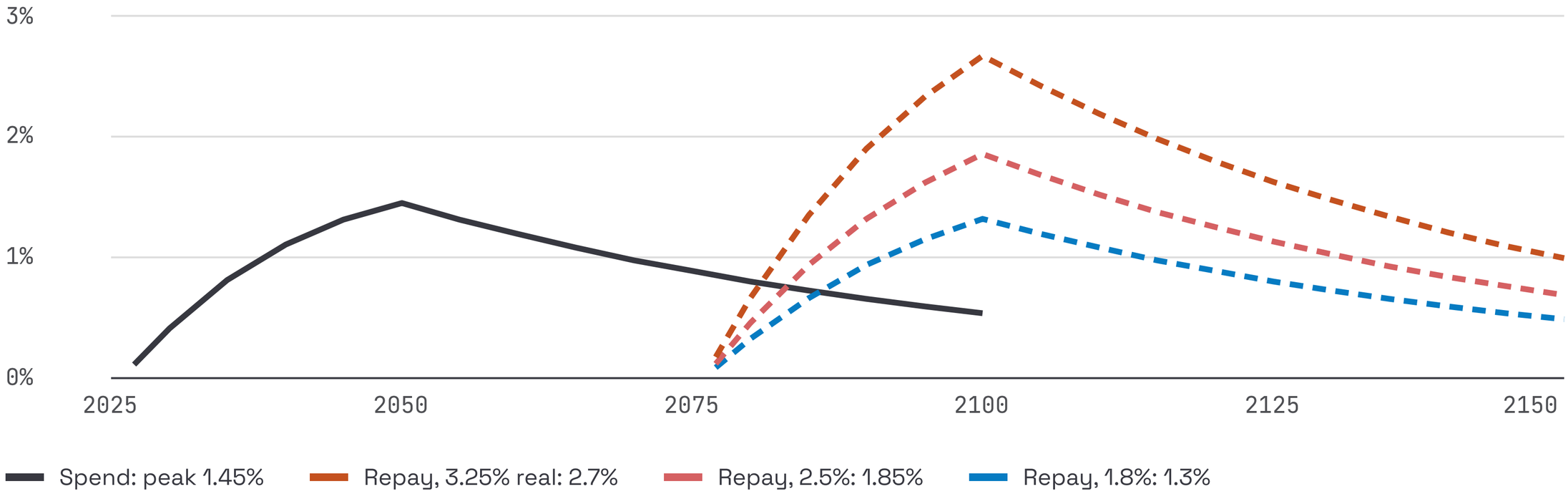
Error 7: each "Cost % GDP" point equals the "Expenditure % GDP" point 50 years earlier × ~0.29. It should be × 1.025^50 ÷ 50 years of GDP growth, so repayment was understated about 3.5×.

Peak spending: 0.6–2.9% of GDP



Spending a year as % of world GDP, 2027–2100. 95% cut from a flat 58 Gt CO2e baseline by 2050, then held. For scale: IPCC AR6 has world GDP 1.3–2.7% lower in 2050 on 2 °C pathways (a loss of output, not spending).

Repayment: same size or bigger



Median case (US$60/t), % of world GDP. Repayment (dashed) is each year's spend × (1 + r)^50, as a share of GDP 50 years later. Peak stock of Carbon Bonds: 21–33% of world GDP if bonds fund only the 2027–2050 build-out; 51–75% if they fund everything to 2100.

Carbon Bonds move the bill. They don’t shrink it.

~1.5%

of world GDP a year at the median cost: affordable, and inside the IPCC range.

r vs g

Deferral is cheap only when real interest rates are at or below real growth (~2%). Today they are ~3.2%.

21–33%

Peak stock of Carbon Bonds as a share of world GDP (median, build-out only). Large on top of 94% public debt.

The case for Carbon Bonds is now political, not financial: they let a coalition act today without first agreeing who pays. Mix them with pay-as-you-go when rates are high.

Close cousins, no exact match

Publication	Idea, and how it differs
Broome & Foley 2016, A World Climate Bank	Closest. A mutual bank issues very long bonds and buys out fossil-reserve owners. Pays interest.
Flaherty et al. 2017, Res Int Bus Finance	Very close. Climate bonds fund mitigation now; future generations repay.
Sachs 2015, Oxford Handbook	Share the burden between generations; the basis for Flaherty et al.
Kotlikoff et al. 2021, Int Econ Rev	Carbon tax plus transfers between generations: everyone gains.
Harstad 2012, J Polit Econ	A coalition buys fossil deposits and leaves them in the ground.
Nordhaus 2015, Am Econ Rev	Climate clubs: trade penalties, not discounts, to make countries join.

Not found anywhere: zero-coupon bonds with cost shares set at maturity by GDP and a discount for early joiners.

The parts are being built

US$1T+

Aligned green and sustainable bonds issued a year, for three years; US$6.8T in total.

€84bn

NextGenerationEU green bonds outstanding (Jul 2026): joint EU debt for climate.

100 yrs

Austria, Argentina and Mexico have all sold century bonds. Argentina's fell to ~50 cents.

2021

ADB Energy Transition Mechanism starts buying out coal plants for early retirement.

What is missing is the scale, and a coalition willing to underwrite it.

Sources: Climate Bonds Initiative (17 Mar 2026); European Commission; Bloomberg (12 Sep 2017); ADB. Also: Tropical Forests Forever Facility (COP30), a bond-invested endowment, ~US$7bn pledged.

Questions

- How to get every country to join: game theory, no deadlines
- How best to spend the money: buy-outs first?
- Mixing bonds with carbon prices when real rates are high
- Who guarantees the debt if a member defaults in 2077?

FIND AN ERROR?

The 2007 version had seven. If you find a fatal flaw in this one, not just a hard step, I want to hear about it.