THERMGLASS Modeled Scenarios

ROI engine sensitivity sweep - architectural VIG, US and EU models

This document collects the climate, fuel, tariff, area, and installed-cost combinations behind the VIG-versus-triple-glazing sweep on thermglass.com. Every figure comes from the THERMGLASS ROI engine at its stated inputs: triple-pane baseline held fixed (0.20 Btu/h-ft2-degF US, about 1.14 W/m2-K; 0.80 W/m2-K EU, whole-window), VIG at 0.13 / 0.73, 500 sq ft / 50 m2 of glazing, gas heat at the default tariff, and the full installed-cost figure for the vacuum units ($18/sq ft US, EUR 180/m2 EU) unless a table varies it. The price input is the full installed cost of the vacuum units - what the buyer pays for the glazing - not a premium over the glazing replaced.

Default-scenario summary

Engine defaults and stress cases

Scenario	Annual savings	Payback	25-yr NPV
US default (double low-e 0.45)	$643/yr	14.0 yr	+$2,633
US single-pane baseline (1.10)	$1,612/yr	5.6 yr	+$20,173 (25-yr)
EU default (double low-E 1.40)	EUR 802/yr	11.2 yr	+EUR 5,517
US triple-baseline stress (0.20)	$270/yr	33.3 yr	-$4,113
EU triple-baseline stress (0.80)	EUR 514/yr	17.5 yr	+EUR 297

Savings combine heating fuel and site electricity as site energy; fuel rates differ, so kWh times the electricity rate does not equal the savings figure. Each stress case is measured against its own regional triple baseline - the 17.5- and 33.3-year figures are not directly comparable.

Climate sweep (US, triple baseline, gas heat)

IECC zone sweep - 500 sq ft, $18/sq ft installed cost

Zone	HDD	kWh/yr saved	$/yr saved	Payback
2	1,500	2,364	$333	27.1 yr
3	2,750	2,354	$293	30.7 yr
4	4,450	2,643	$287	31.3 yr
5	6,300	2,933	$277	32.5 yr
6 (default)	8,350	3,278	$270	33.3 yr
7	11,000	3,823	$276	32.6 yr
8	14,000	3,746	$173	52.1 yr

The dollars follow the cooling season, not the heating season. Zone 2 saves 1,963 cooling kWh of its 2,364 kWh total; zone 8 has no cooling season at all, so its heating-only savings price out at $173/yr. Payback bottoms in the warm-humid South and collapses past 50 years in zone 8.

Fuel sweep (US, zone 6, triple baseline)

Heating system variants - 500 sq ft, $18/sq ft installed cost

Heating system	Assumptions	$/yr saved	Payback
Gas furnace (default)	92% AFUE, $1.35/therm	$270	33.3 yr
Heat pump	COP 3.0, $0.16/kWh	$277	32.5 yr
Oil furnace	85% AFUE, $4.20/gal	$436	20.6 yr
Electric resistance	$0.16/kWh	$496	18.1 yr

The best cell in the entire US sweep is zone 7 with resistance heat: $574/yr, a 15.7-year payback. Switching fuel moves the payback more than any single climate move.

Climate sweep (EU, triple baseline 0.80, gas heat)

EU region sweep - 50 m2, EUR 180/m2 installed cost

Region	HDD	kWh/yr saved	EUR/yr saved	Payback
Mediterranean	1,250	2,498	EUR 679	13.3 yr
Oceanic	2,750	1,761	EUR 448	20.1 yr
Central (default)	3,250	2,025	EUR 514	17.5 yr
Continental	3,500	2,160	EUR 547	16.4 yr
Nordic	5,500	1,801	EUR 414	21.7 yr
Alpine	6,250	2,513	EUR 601	15.0 yr

The Mediterranean row is 2,381 kWh cooling of 2,498 kWh total - the south leads on avoided cooling, valued at EU electricity tariffs, not on heating. The Nordic row is the weakest dollar result; the Alpine row shows cold-and-sunny beats cold-and-dark.

Installed-cost sweep

US installed cost (zone 6, triple baseline, gas)

Installed cost	Payback	25-yr NPV
$9/sq ft	16.7 yr	+$387
$12/sq ft	22.2 yr	-$1,113
$18/sq ft (default)	33.3 yr	-$4,113
$25/sq ft	46.3 yr	-$7,613

EU installed cost (central, triple baseline, gas)

Installed cost	Payback	25-yr NPV
EUR 90/m2	8.8 yr	+EUR 4,797
EUR 120/m2	11.7 yr	+EUR 3,297
EUR 180/m2 (default)	17.5 yr	+EUR 297
EUR 250/m2	24.3 yr	-EUR 3,203

The relationship is almost exactly linear: halve the installed cost, halve the payback. The NPV sign flips around $9-10/sq ft in the US scenario and between EUR 180 and EUR 250 in the EU scenario - a more useful decision boundary than any single payback number.