The Competitive Decarbonisation Ladder

39 RUNGS · OLEFINS SPLIT BY TEMPERATURE · 16 NOVEMBER 2026

VERSION A · 2025 INDUSTRIAL POWER PRICES

Power at what large European plants actually paid in 2025: the Eurostat price for 70–150 GWh a year, excluding VAT. This is the price most industry buys on, through long-term contracts.

	EUROPE THRESHOLDS		EUROPE					GLOBAL				
	€40 power	€25 power	Nordics	France	Iberia	Germany	Italy	USA	Brazil	China	India	Japan
Industrial power 2025 · €/MWh	€40	€25	€60	€77	€99	€144	€144	€75	€75	€82	€80	€140
Grid CO_2 · t/MWh	clean	clean	0.03	0.05	0.13	0.35	0.31	0.37	0.10	0.55	0.65	0.47
Gas price · €/MWh	91	91	91	91	91	91	91	10	45	67	62	81
ELECTRICITY LADDER												
BEV (cars)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
E-trucks (fleet average)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional	Accelerate
Heat pumps	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional	Conditional	Accelerate	Accelerate	Conditional	Conditional	Conditional
AI hyperscale clusters	Accelerate	Accelerate	Accelerate	Accelerate	Conditional	Resequence	Resequence	Resequence	Accelerate	Resequence	Resequence	Resequence
Battery gigafactories	Accelerate	Accelerate	Accelerate	Conditional	Conditional	Resequence	Resequence	Conditional	Accelerate	Resequence	Resequence	Resequence
Chlor-alkali on clean power	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional	Conditional	Accelerate	Accelerate	Conditional	Conditional	Conditional
Net-zero silicones	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Resequence	Resequence	Accelerate	Accelerate	Conditional	Conditional	Conditional
E-glass (electric melting)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Resequence	Resequence	Conditional	Accelerate	Conditional	Conditional	Conditional
E-steel (H_2-DRI/EAF)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Resequence	Resequence	Accelerate	Accelerate	Conditional	Resequence	Resequence
Cement + CCS	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional	Conditional	Accelerate	Accelerate	Conditional	Conditional	Conditional
Crackers + CCS	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Resequence	Resequence	Conditional	Accelerate	Resequence	Resequence	Resequence
Crackers: site heat (low temp.)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Crackers: e-cracking (high temp.)	Conditional	Accelerate	Conditional	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
Green ammonia	Conditional	Accelerate	Conditional	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
Shipping e-fuels	Conditional	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
E-SAF (e-kerosene)	Conditional	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
Green hydrogen	Conditional	Conditional	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
RENEWABLE CARBON LADDER												
Mechanical recycling	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Depolymerisation & dissolution	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
CO_2-based polyols	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Chemical recycling	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional	Conditional	Conditional
Waste gasification to methanol	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional	Conditional	Accelerate	Accelerate	Conditional	Conditional	Conditional
Green bio-methanol	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Bio-LNG for shipping (biomethane)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Bio-ethylene (bio-PE)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Bio-naphtha (drop-in)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Bio-SAF: HEFA (waste oils)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Bio-SAF: alcohol-to-jet	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Waste-to-jet (gasification + FT)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Green e-methanol	Conditional	Conditional	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
Green e-methanol (DAC CO_2)	Resequence	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
e-Polyolefins (CO_2-to-plastics)	Resequence	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
INDUSTRIAL BIOTECHNOLOGY LADDER												
Enzymatic depolymerisation	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Enzymes for residue sugars	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Precision fermentation	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
PHA (microbial polymers)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Gas fermentation	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional	Conditional	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Fermentation CO_2 capture	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Electro-biology (CO_2 + green H_2)	Conditional	Accelerate	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
Industrial enzymes	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate

Accelerate · Conditional · Resequence

How to read it. Europe's columns use last year's industrial power price, the one most plants pay through long-term contracts. France pays €77 thanks to nuclear contracts; Germany and Italy pay €144. Nordics €60 is an estimate scaled from Eurostat's mid-size band for Sweden and Finland. On these prices about 25 of 39 rungs accelerate across Europe; Version B shows the same ladder at this week's spot prices, where only about 10 do. **Olefins split by temperature.** Site heat (steam, distillation reboilers, below ~200°C) with heat pumps and e-boilers pays across Europe at gas of €91/MWh. Furnace e-cracking (above ~800°C) abates only ~0.16 t CO_2/MWh: conditional in the Nordics and France, and it accelerates only with clean power near €25/MWh. €40 · €25: the same rules if clean power cost that much at the best solar, wind or hydro sites. Brent $96/bbl, EUA €88/t, TTF €91/MWh (13 November 2026). Indicative.

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VERSION B · THIS WEEK'S SPOT POWER PRICES

Power at this week's wholesale spot price: the 9–14 November day-ahead average plus grid fees and levies. This is what a plant buying on the spot market would pay; most industry is shielded by contracts.

	EUROPE THRESHOLDS		EUROPE					GLOBAL				
	€40 power	€25 power	Nordics	France	Iberia	Germany	Italy	USA	Brazil	China	India	Japan
Spot + grid fees, 9–14 Nov · €/MWh	€40	€25	€171	€300	€202	€343	€367	€75	€75	€82	€80	€140
Grid CO_2 · t/MWh	clean	clean	0.03	0.05	0.13	0.35	0.31	0.37	0.10	0.55	0.65	0.47
Gas price · €/MWh	91	91	91	91	91	91	91	10	45	67	62	81
ELECTRICITY LADDER												
BEV (cars)	Accelerate	Accelerate	Accelerate	Resequence	Accelerate	Resequence	Resequence	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
E-trucks (fleet average)	Accelerate	Accelerate	Conditional	Conditional	Conditional	Resequence	Resequence	Accelerate	Accelerate	Accelerate	Conditional	Accelerate
Heat pumps	Accelerate	Accelerate	Conditional	Conditional	Conditional	Resequence	Resequence	Accelerate	Accelerate	Conditional	Conditional	Conditional
AI hyperscale clusters	Accelerate	Accelerate	Conditional	Resequence	Conditional	Resequence	Resequence	Resequence	Accelerate	Resequence	Resequence	Resequence
Battery gigafactories	Accelerate	Accelerate	Conditional	Resequence	Conditional	Resequence	Resequence	Conditional	Accelerate	Resequence	Resequence	Resequence
Chlor-alkali on clean power	Accelerate	Accelerate	Resequence	Resequence	Resequence	Resequence	Resequence	Accelerate	Accelerate	Conditional	Conditional	Conditional
Net-zero silicones	Accelerate	Accelerate	Conditional	Resequence	Conditional	Resequence	Resequence	Accelerate	Accelerate	Conditional	Conditional	Conditional
E-glass (electric melting)	Accelerate	Accelerate	Resequence	Resequence	Resequence	Resequence	Resequence	Conditional	Accelerate	Conditional	Conditional	Conditional
E-steel (H_2-DRI/EAF)	Accelerate	Accelerate	Resequence	Resequence	Resequence	Resequence	Resequence	Accelerate	Accelerate	Conditional	Resequence	Resequence
Cement + CCS	Accelerate	Accelerate	Conditional	Resequence	Conditional	Resequence	Resequence	Accelerate	Accelerate	Conditional	Conditional	Conditional
Crackers + CCS	Accelerate	Accelerate	Resequence	Resequence	Resequence	Resequence	Resequence	Conditional	Accelerate	Resequence	Resequence	Resequence
Crackers: site heat (low temp.)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Conditional	Conditional	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Crackers: e-cracking (high temp.)	Conditional	Accelerate	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
Green ammonia	Conditional	Accelerate	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
Shipping e-fuels	Conditional	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
E-SAF (e-kerosene)	Conditional	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
Green hydrogen	Conditional	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
RENEWABLE CARBON LADDER												
Mechanical recycling	Accelerate	Accelerate	Accelerate	Conditional	Accelerate	Resequence	Resequence	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Depolymerisation & dissolution	Accelerate	Accelerate	Accelerate	Conditional	Accelerate	Conditional	Conditional	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
CO_2-based polyols	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Chemical recycling	Accelerate	Accelerate	Conditional	Resequence	Resequence	Resequence	Resequence	Accelerate	Accelerate	Accelerate	Conditional	Conditional
Waste gasification to methanol	Accelerate	Accelerate	Conditional	Resequence	Conditional	Resequence	Resequence	Accelerate	Accelerate	Conditional	Conditional	Conditional
Green bio-methanol	Accelerate	Accelerate	Accelerate	Conditional	Accelerate	Conditional	Conditional	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Bio-LNG for shipping (biomethane)	Accelerate	Accelerate	Accelerate	Conditional	Accelerate	Conditional	Conditional	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Bio-ethylene (bio-PE)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Bio-naphtha (drop-in)	Accelerate	Accelerate	Accelerate	Conditional	Conditional	Conditional	Conditional	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Bio-SAF: HEFA (waste oils)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Bio-SAF: alcohol-to-jet	Accelerate	Accelerate	Accelerate	Conditional	Accelerate	Conditional	Resequence	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Waste-to-jet (gasification + FT)	Accelerate	Accelerate	Accelerate	Resequence	Accelerate	Resequence	Resequence	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Green e-methanol	Conditional	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
Green e-methanol (DAC CO_2)	Resequence	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
e-Polyolefins (CO_2-to-plastics)	Resequence	Conditional	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
INDUSTRIAL BIOTECHNOLOGY LADDER												
Enzymatic depolymerisation	Accelerate	Accelerate	Accelerate	Conditional	Accelerate	Resequence	Resequence	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Enzymes for residue sugars	Accelerate	Accelerate	Conditional	Resequence	Resequence	Resequence	Resequence	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Precision fermentation	Accelerate	Accelerate	Accelerate	Conditional	Accelerate	Conditional	Conditional	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
PHA (microbial polymers)	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Gas fermentation	Accelerate	Accelerate	Accelerate	Resequence	Accelerate	Resequence	Resequence	Accelerate	Accelerate	Accelerate	Accelerate	Conditional
Fermentation CO_2 capture	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate
Electro-biology (CO_2 + green H_2)	Conditional	Accelerate	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence	Resequence
Industrial enzymes	Accelerate	Accelerate	Accelerate	Conditional	Accelerate	Conditional	Resequence	Accelerate	Accelerate	Accelerate	Accelerate	Accelerate

Accelerate · Conditional · Resequence

How to read it. Europe's columns use this week's spot market: the 9–14 November day-ahead average plus grid fees and levies. Spot power jumped in a cold, low-wind week (France averaged €334/MWh day-ahead on 9 November), so this is a stress test, not what most plants pay. On these prices only about 10 of 39 rungs accelerate across Europe, against about 25 at 2025 industrial prices (Version A). **Olefins split by temperature.** Site heat (steam, distillation reboilers, below ~200°C) with heat pumps and e-boilers still pays in the Nordics, France and Iberia at gas of €91/MWh, and is conditional in Germany and Italy. Furnace e-cracking (above ~800°C) abates only ~0.16 t CO_2/MWh and waits for clean power at €25–40/MWh. €40 · €25: the same rules if clean power cost that much at the best solar, wind or hydro sites. Brent $96/bbl, EUA €88/t, TTF €91/MWh (13 November 2026). Indicative.