

As Canada builds clean, why does galvanizing **out-perform** on carbon, GWP, and cost?

Canada’s infrastructure agenda is shifting toward low-embodied-carbon materials and whole-life cost accountability. Hot-dip galvanizing (HDG) is one of the few corrosion-protection systems that wins on all three fronts at once, without trading off durability.

Why this matters now: Construction materials account for roughly 11–13% of Canada’s total GHG emissions. Infrastructure Canada, NRCan, and PSPC are jointly developing the federal **Buy Clean Strategy** and have established a **Standard on Embodied Carbon in Construction** — both built on the principle that materials should be chosen for their full life-cycle impact, not just sticker price. Galvanizing already meets that bar today.

CARBON (GWP) 38 % of paint’s Greenhouse-effect score of hot-dip galvanizing vs. an equivalent painted steel system over matched service life (TU Berlin LCA, car park structure).	LIFECYCLE ENERGY 63 % less 23,700 MJ for an HDG balcony system over 60 years vs. 64,700 MJ for the painted equivalent, which needs repainting roughly every 15 years.	LIFECYCLE COST 2–5x cheaper Painted systems carry direct maintenance costs 2–5x their initial cost, with indirect costs (downtime, access, traffic control) running up to 11x higher.
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GALVANIZING VS. PAINT — MATCHED SERVICE LIFE

Impact category	Hot-dip galvanizing	Paint system
Greenhouse effect (GWP)	38%	100% (baseline)
Resource consumption	32%	100% (baseline)
Eutrophication potential	18%	100% (baseline)
Maintenance-free service life	50–90 years	Recoat every 10–15 years
End-of-life pathway	Cradle-to-cradle — steel and zinc both fully recyclable	Coating enters waste stream or is burned off at removal

Sources: Institute for Environmental Protection Technology, TU Berlin (EN ISO 1461 vs. EN ISO 12944 LCA); VTT Technical Research Finland balcony LCA case study; American Galvanizers Association.

Why the carbon case holds up

- **No recoat cycle.** Most of a painted structure’s lifetime carbon comes from repeated maintenance, not the first coat — galvanizing avoids that entirely for 50+ years.
- **Coating impact is small next to maintenance.** A coating’s own GWP is typically ≤1–2% of a structure’s whole-life footprint; the deciding factor is how often you have to repeat it.
- **Zinc is fully recyclable.** At end of life, steel and zinc separate cleanly during recycling, with zinc dust captured and resold — nothing is downcycled or landfilled.

Why the cost case holds up

- **Initial cost is often comparable** to multi-coat paint systems, before any maintenance is factored in.
- **Maintenance dominates lifecycle cost.** Direct repaint costs run 2–5x the initial spend; indirect costs (lane closures, scaffolding, traffic control) can run up to 11x higher.
- **Fewer interventions, less disruption.** For public infrastructure, every avoided maintenance cycle is also avoided downtime — a cost rarely captured in tender price alone.