

Bus-Loop Redesign + Idling Enforcement (Health + Costs)

FOR: School district, facilities & transportation • **PARTNERS:** city air/health depts • **SDGs:** 3 • 11 • 13

One-sentence summary. Redesign bus loops to move queues away from doors and air intakes, add no-idle zones with signage and training, and enforce ≤ 3 -5 minutes idling—cutting student exposure, fuel waste, and complaints.

Why it matters

EPA's Idle-Free Schools Toolkit shows that idling wastes fuel/money and exposes children to harmful diesel exhaust. Studies find idling buses spike ultrafine particles near tailpipes and inside cabins. Clear layouts and enforcement policies lower exposure and operating costs.

Evidence (key points)

- EPA: eliminating unnecessary idling saves fuel and reduces pollution; Idle-Free Schools Toolkit provides step-by-step playbook.
- Ultrafine particles surge (up to 26×) near idling diesel tailpipes; cabin exposures can exceed nearby car levels.
- Philadelphia and Pennsylvania set idling limits (5 minutes with defined exceptions).

Options considered

Option	What it looks like	Pros	Cons
Status quo	Buses idle near doors/intakes; long queues	No capital	High exposure; fuel waste; complaints
No-idle policy + loop markings	Signs, painted bays, supervisor with clipboard; ≤ 3 -5 min idling	Low cost; quick fuel/emission cuts	Requires supervision & reminders
Operational + design upgrade	Rerouted loop; remote staging; electric signs; covered waiting	Largest exposure cuts; better flow	Moderate capital; coordination with facilities

Alt text: Table compares status quo, policy+markings, and design/ops upgrade.

Recommendations

- 1) Map and move intakes/doors vs. bus stacks; stage buses away from entrances; assign departure windows to cut dwell time.
- 2) Adopt & enforce no-idle zones with signs, driver training, and monthly observations; include penalties for repeat violations.
- 3) Track the gains: idling minutes, fuel saved, PM readings at doors—publish a dashboard.

Local data & resources: Philadelphia

- [Philadelphia — Air Pollution & Idling Regulations \(brochure & regs\)](#)
- [Philadelphia Code §12-1127 — Excessive Idling](#)
- [EPA — Idle-Free Schools Toolkit \(how-to\)](#)
- [AFDC — School Bus Idle Reduction Strategies](#)

How we'll measure success

- Observed idling minutes: ↓ 60–80% by month 3
- Fuel use per bus: ↓ 3–10% (season-adjusted)
- Doorway PM2.5 during arrival/dismissal: ↓ vs baseline
- Complaints about fumes: ↓ 75%

Credits & sources (clickable)

- [EPA — School Bus Idle Reduction](#)
- [EPA — Idle-Free Schools Toolkit \(overview\)](#)
- [CDC/NIOSH — Ultrafine particles near idling school buses \(study\)](#)
- [EPA — Making School Buses Cleaner \(health rationale\)](#)