CFISD Reusable Tray Initiative: Smart Economics, Better Health, Greener Schools

Executive Summary

Each year, CFISD spends nearly $1 million on disposable Styrofoam lunch trays that are used once and discarded. This practice generates over 196 metric tons of plastic waste annually, produces 745+ metric tons of carbon emissions, and exposes students to styrene, a chemical described as “reasonably anticipated to be a human carcinogen”.1

This proposal outlines a pilot program to introduce reusable metal trays at two elementary schools, with a roadmap to expand district-wide in the next few years. An external partner will fully fund the trays, with minimal equipment costs that may qualify for additional subsidies.The pilot will demonstrate logistical feasibility, measure savings, and set the foundation for long-term cost reduction, health protection, and environmental stewardship.

The Problem: Styrofoam is Costly In Every Way

Financial Cost

- Tray purchases: $806,500 per year for 12.5 million trays
- Disposal cost: $169,401 per year for hauling styrofoam trays
    - Given styrofoam’s inefficient weight-to-volume ratio, we often pay more per pound in terms of hauling costs
- Total annual cost: $975,901 of taxpayer money

With budget deficits ahead, styrofoam remains a burden.

Environmental Cost

- Plastic waste: 196.25 metric tons (196,250 kg) (equivalent to 65 elephants)
- Carbon emissions: 745.75 metric tons CO_2e (equivalent to 162 cars)
    - This means the carbon cost of CFISD’s tray usage each year is equivalent to what would be absorbed by a mature forest of over 27,000 trees.
- Landfill volume: Approximately 7 million gallons per year
- Decomposition time: 500+ years in landfills

Health Risk

- Styrofoam, or Expanded Poly***styrene***, is made up of long styrene chains. Styrene is a chemical that has raised serious concerns among independent scientific bodies worldwide, including WHO (World Health Organization), EPA (Environment Protection Agency), NTP (The National Toxicology Program), IARC (International Agency for Research on Cancer), NIH (National Institutes of Health) because it is likely to be carcinogenic and an endocrine disruptor.
- Styrene leaches into food when exposed to heat, fat, or acid— the composition of most meals. Styrene is worse with accumulation or long term exposure. Chronic exposure would be like a student who has lunch throughout their K-12 career.
- While the specific dosage at which styrene is harmful is contested, children are particularly vulnerable due to higher dose-to-body weight ratios and being in a critical growth period.
- Children's Environmental Health Network recommends "If take-away food comes in styrofoam, take the food out of its foam container as soon as possible".

The Solution: Reusable metal lunch trays

Why Make This Change?

- Financial Impact:
    - CFISD currently uses 12.5 million disposable trays annually
    - Transition to reusables will generate immediate and long-term cost savings
- Environmental Benefits: Significant reduction in waste and environmental footprint
- Health Considerations: Elimination of potential health concerns from styrofoam food containers
- Educational Value: Demonstrates environmental stewardship to students

Metal lunch trays are economical, sustainable, healthy, and can be sourced directly from the USA.

Many neighboring districts such as North East ISD, Austin ISD (not every school yet), Humble ISD, and Florence ISD have made or maintained the switch to reusables. Moreover, countless other schools across the nation have made the switch, reporting significant financial savings and environmental benefits.

Note: These calculations cover the entire district for the 177 day school year.

Financial Benefits (5-Year Projection)

Cost Avoidance

Category	Annual Amount	5-Year Total
Tray Purchases	$806,500	$4,032,500
Waste Disposal of Styrofoam	$169,401	$847,005
Total Direct Savings	$975,901	$4,879,505

Implementation Costs

Category	One-Time Cost	Recurring Annual Cost	5-Year Total
Metal Trays	$0 (subsidized)	$0	$0
Drying & Other Equipment Upkeep*	$-	$25,000	$125,000
Replacement Trays (5% annually)	$0	$40,000	$200,000
Labor (net difference)†	$0	$395,064	$1,975,320
Total Implementation Cost	$155,338	$446,064	$2,300,320

While water, electricity, and maintenance costs could not be calculated with the data available, the School Nutrition Foundation analyzed multiple serving systems in school cafeterias and found that reusable compartment trays used were the least expensive.

While exact equipment costs for the metal tray system cannot be precisely determined at this stage, we can confidently project that the annual operational costs will decrease compared to our current styrofoam usage. The initial investment in drying equipment and storage infrastructure represents a one-time capital expenditure that will be offset by the elimination of recurring styrofoam purchases.

In the **worst case scenario**, if existing equipment cannot be used for the trays, grants are not won, and all 93 schools require a conveyor dish machine (93 @ $23,500), then it would **take us 4.8 years to break even.**

Environmental Benefits (5-Year Comparison)

Category	Styrofoam (Current)	Metal Trays (Proposed)	5-Year Impact
Waste Generation	981.25 metric tons	Nearly zero	981.25 metric tons avoided
Landfill Volume	35 million gallons	~0	35 million gallons saved
Single-Use Items	62.5 million trays	None	62.5 million items avoided
Carbon Emissions	3,729 metric tons CO_2e	~0*	3,729 metric tons avoided
Tree Equivalent	Requires 135,000 trees to offset	~0	135,000 trees of carbon absorption

*Small emissions from dishwashing not calculated but significantly less than manufacturing

†Water and energy for dishwashing not included but substantially less than manufacturing requirements

Health Benefits (5-Year Comparison)

Category	Styrofoam (Current)	Metal Trays (Proposed)	5-Year Impact
Styrene Exposure Events	67.9 million instances*	0	67.9 million exposures avoided
Students Protected	0	118,057 annually	118,057 students for 5 years
Chemical Leaching Risk	Moderate to High (when exposed to heat, fat, acid)	None	Eliminated
Alignment with Health Organization Recommendations	Poor	Strong	Improved compliance

*Assuming 65% of the student population eats lunch in schools

Cumulative 5-Year Impact

Financial

- $393,685 in net savings over 5 years (assuming worst case scenario)
- Break-even achieved within standard 5-year budget cycle
- Reduced vulnerability to petrochemical price fluctuations
- Annual savings of $391,762 after break-even

Environmental

- 981 metric tons of waste eliminated (equivalent to 325 elephants)
- 3,729 metric tons of carbon emissions prevented (equal to removing 810 cars from roads for 5 years)
- 62.5 million single-use items kept out of landfills
- 35 million gallons of landfill space preserved

The side-by-side comparison demonstrates that transitioning to reusable metal trays represents a financially sound investment with substantial environmental and health benefits. While requiring an initial capital outlay, the program generates positive financial returns within the standard 5-year budget cycle, breaking even at approximately 3 years assuming we have to buy all metal trays out of pocket. We are likely to receive subsidies from external resources driving this number further down.

After the break-even point, CFISD would realize nearly $392,000 in annual savings that could be redirected to educational priorities. Simultaneously, the district would eliminate a significant source of environmental impact and remove a potential health concern for all 118,057 students.

This analysis confirms that reusable trays deliver measurable, positive outcomes across financial, environmental, and health dimensions, making it a prudent long-term investment for the district.

The process

1. Serving: Students receive food on durable metal trays
2. Collection: Students clear food waste and stack trays on collection racks
3. Rinsing: Staff quickly spray off any remaining food debris
4. Washing: Trays process through dish machine sterilizing them
5. Drying: Clean trays air dry on specialized racks (30 minutes)
6. Storage: Dry trays are stacked for next meal service

Pilot Program: Measures and Funds

Trays can be fully subsidized by Plastic Free Restaurant. Supporting equipment subsidies are likely available from other organizations and grants.

The pilot should be at an elementary school with

- A high temp (as opposed to chemical) industrial conveyor dish machine
- Adequate staffing
- Lower end of enrollment sizes.

Elementaries with enrollment sizes such as Lowrey (661) and Sampson (900) would be ideal. Given the short timeline, the pilot should be continued to summer school at Anthony & Bleyl Middle School for greater data points. The pilot schools should be chosen carefully as they will become the baseline for a kitchen operations audit.

Note: CFISD's school year consists of 177 instructional days. All pilot math, savings, and logistics are calculated accordingly for accuracy.

Considerations

- High Temp, Conveyor dish machine. Temperature sanitizes the trays and helps transpire water off the metal trays leading to faster drying times.
- Metal lunch trays
    - Low weight - easy for staff and smaller children (~1 lb each)
    - Efficient compartmentalization so students can carry them easily and multiple rounds of washing does not warp the trays
- Industrial, Overhead dryers that are placed at the end of a dish machine. For high volume schools, dish racks will not be enough given limited spacing in the kitchen. Furthermore, they are relatively inexpensive (~$4,000) and cost effective for time, and therefore labor costs.

- Lowrey Elementary: 661 students (69,987 trays per school year)
- Sampson Elementary: 900 students (95,293 trays per school year)

	Lowrey Elementary	Sampson Elementary
Enrollment	661	900
Trays needed (1.2x buffer)	795	1080
Drying Racks	2	3
Wash time (original enrollment & 249 racks/hr)	13.27 mins	18.07 mins
Full Processing Time	43.27 minutes	48.07 mins
Labor Costs ($13.3-16/hr)	$9.62-11.53	$10.68-12.82

Resource Requirements

- Trays: $0 (subsidized by Plastic Free Restaurant)
- Drying racks: $2,200 (5 racks @ $440 each, holding 380 trays each)
- Labor: $16/hour × 1 hour/day = $16/day (vs. $26/day for disposables)

Cost Benefit of Pilot (10 days)

- Styrofoam trays eliminated: ~18,677
- Cost saved: $76

Why These Smaller Schools?

- Manageable enrollment size creates lower operational risk
- Existing industrial dish machines reduce startup costs
- Similar to other elementary schools, making the pilot easily scalable
- Provides faster feedback loops for process improvement

Pilot Success Metrics:

- Operational efficiency (time to process trays)
- Staff and student satisfaction
- Tray durability and functionality
- Actual vs. projected cost savings

Addressing Potential Challenges

Challenge	Mitigation Strategy
Staff Reluctance	Comprehensive training, involvement in process design, recognition program
Dish machine Capacity	Staggered implementation, process optimization, additional equipment where needed

Drying Time	Strategic placement of drying racks, driers, workflow optimization
Tray Durability	Quality selection, handling procedures, 5% replacement budget
Student Adaptation	Education campaign, student involvement in implementation
Water/Energy Usage	High-efficiency equipment, optimizing serveware placement in washing racks.

Implementation Timeline

Phase 1: Pilot (Now – End of School Year)

- Conduct kitchen workflow analysis (immediate)
- Order trays (1-month domestic lead time)
- Train staff, create standard operating procedures
- Launch pilot and collect usage data
- Pilot: May 16-29 and recommended to continue to summer school

Phase 2: Elementary Expansion (2025)

- Scale to all elementary schools by May 2025

Phase 3: Secondary Schools (2026-2027)

Plan of Action

- Carefully pursue compostable contracts ($0.05 vs current $0.06) for existing non-reusable needs.

- Launches should be tiered as to not overwhelm nutrition services HQ and staff; finding support from outside groups/distribution of initial workload, if needed.

Why Not Compostables?

I have several years of experience enhancing sustainability in commercial kitchens. My experience shows that compostable and biodegradable plastics often fail to meet necessary environmental and health standards, or they come with significantly higher costs. According to the Center for Environmental Health, "Paperboard food service ware (FSW) may contain toxic chemicals, including per-and polyfluoroalkyl substances (PFAS), used to provide grease and liquid resistance."

In summary, compostable alternatives pose several challenges:

- Require industrial composting facilities.
- Often contain PFAS or other chemicals of concern
- Higher ongoing costs compared to reusables
- Less environmental benefits than reusable trays

In the interim, while some schools in the district do not have reusables, the Center for Environmental Health can support finding products that have been tested to be safe.

Long-Term Planning

- Incorporate dish machines and dryers in any new construction or renovation
- Design kitchens with reusable infrastructure in mind
- Optimize kitchen floorplans for efficient workflow and drying space
- Explore expansion to other serviceware items

External Support and Resources

- Plastic Free Restaurant (full funding for trays)
- NSLP Equipment Assistance Grants (potential for equipment subsidies)
- Center for Environmental Health (technical assistance)
- Countless parents and students who have reached out and shared their concern as well.

My Commitment to CFISD

This project is my thank-you to the district that shaped me: teaching me to use my knowledge for community good and that personal convenience doesn't outweigh harm to others. As a former CFISD student with fond memories of shared cafeteria meals, I offer my expertise and kitchen research services pro bono:

- Professional background: Sustainability fellow at BeVisioneers: The Mercedes-Benz Fellowship, former strategy analyst with Michigan Health Department, and implementation specialist for children's programs
- Services offered: Kitchen workflow analysis, grant writing, equipment procurement assistance, implementation support, and staff training material development
- Cost to district: $0

Next Steps

1. Approve pilot schools (immediate decision needed)
2. Schedule kitchen assessments (within 2 weeks)
3. Submit tray funding application (within 1 week)
4. Develop staff training materials with stakeholders (3 weeks)
5. Order equipment (4 weeks before implementation)
6. Launch pilot program (target date: May 16th)

Additional Opportunities

- Metal reusable serviceware
- Cooled milk dispensers (reducing milk costs and cardboard waste)

    - Recommendations from the Center for Environmental Health (CEH)

Conclusion

This transition represents an opportunity for CFISD to eliminate nearly $1 million in annual waste while protecting student health and demonstrating environmental leadership. If we design the lunch trays and kitchen operations well, we can be successful. With external funding support and a carefully phased implementation, we can create a more sustainable model that benefits our budget, our students, and our planet.

By the end of five years, we can proudly announce that CFISD has eliminated 12.5 million pieces of Styrofoam waste annually while creating substantial long-term budget savings.

Appendix

Dumpster Calculation

- 1 tray = 2 inches tall when improperly stacked
- One 8-yard dumpster = 80 bags = ~1,905 trays
- Annual usage: 12.5 million trays = 4,416 dumpsters/year

Tray Usage

- Lowrey
    - Proportion = 661/118,057 (District enrollment)
    - 12.5 Million Trays * Proportion = Annual Tray Usage (69,988)
    - Styrofoam Trays Used In a Day = Annual Tray Usage/ 177 School Days (396 Trays)
    - 10 Days * 396 = 3,960 Sytrofoam Trays
- Sampson
    - Proportion = 900/118,057 (District enrollment)
    - 12.5 Million Trays * Proportion = Annual Tray Usage (95,293)
    - Styrofoam Trays Used In a Day = Annual Tray Usage/ 177 School Days (539 Trays)
    - 10 Days * 539 = 5,390 Sytrofoam Trays
- Cost = 5,390 + 3,960/ 12.5 million trays * Annual cost of styrofoam trays ($806,500) = $603.26
- Waste Disposal = 1905 trays per 8 cyd waste
- $25.57 per 8 cyd = $125.50
- Total = $728.76

Drying Racks

- Regency 24" x 60" Green Epoxy Drying Rack 4-Shelf Kit with 64" Posts and Casters - 1 1/4"Slots

    - https://www.webstaurantstore.com/regency-24-x-60-green-epoxy-drying-rack-shelf-kit-with-64-posts-and-casters-1-1-4-slots/460EG2460D1C.html
    - 24 inches means two styrofoam trays can be placed in one

Equipment Ordering Guidelines

- Domestic suppliers: Allow 2 weeks-1 month lead time
- International suppliers: Allow 2 months lead time

Health Benefits
Assuming 65% of the student population eats lunch in schools then
118,057 total enrollment *0.65 % of student body*177 school days*5 years