

Sustainable Fort Lewis: A Part of the Solution



Federal Facilities Council
Washington, DC
3 September 2008

Paul T. Steucke, Jr.
Chief, Environmental Division
Public Works, Fort Lewis, WA
253-966-1760, paul.steucke@us.army.mil



Why ISO 14001 and Sustainability?



Because one mistake wipes out a decade of good work.

“I am convinced that the military ought to organize and run a nationwide environmental clean up and education program, maybe **with the guys at Fort Lewis in command**”

“Fort Lewis could leave a large footprint on the environment in Western Washington; instead, **the Fort is a model for how to protect the environment**”

Fort Lewis Gasses Spanaway: Schools Evacuated

Tacoma News Tribune

(FORT LEWIS IS) an
**Environmental Oasis
amid the urban sprawl**”

Tacoma news Tribune

“The Fort Lewis Military Reservation contains **some of the most significant natural areas** in the state of Washington”

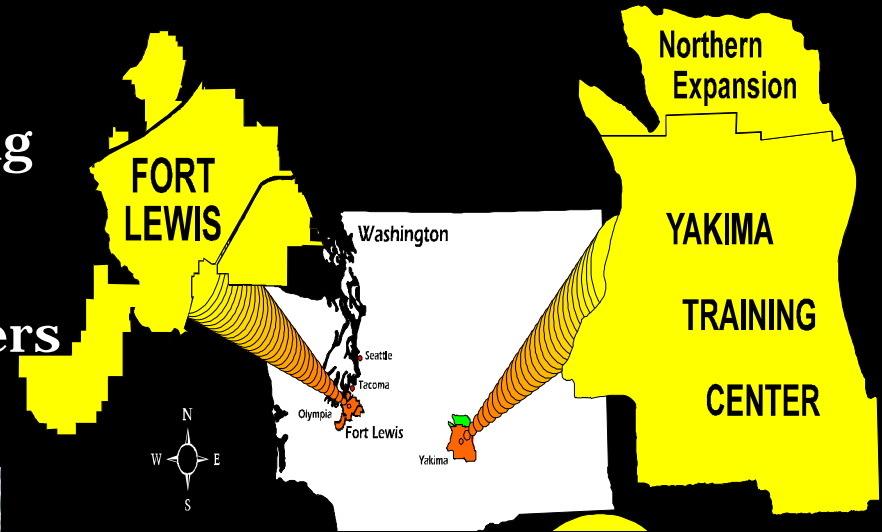
Curt Soper, Nature Conservancy of Washington

“There are trees in there. Five hundred year old trees. May be a thousand. Nobody bothers them. Fort Lewis, the Army, protects them. You have to understand their mission. **The Army's mission is to train troops, not to cut trees..**”

Billy Franks, Nisqually Indian and Chairman of the Northwest Indian Fisheries Commission

What does Sustainability have to do with Fort Lewis?

- Facilities - 22 million square feet
- Industry - maintenance & training
- Major utilities
- Hospital (MAMC)
- Housing - family and single soldiers
- Goods and services



Ft. Lewis - 86, 176 Acres
Yakima - 323,651 Acres

- Because compliance just isn't good enough anymore!
 - The most pollution the law will allow
- "Sustainability is a leader's program."
 - Difference between leadership and management
 - Both are needed



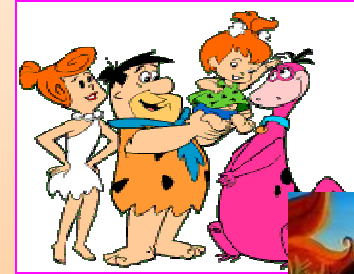


Sustainability is ...



Term describing a state of community growth and development where:

- Present requirements are met
- without compromising ability of future generations
- to meet their own needs



“The application
of the Golden Rule
*from generation to
generation.*”

To avoid conflicts over dwindling resources, we must transition from industrial to sustainable age



Army Strategy



Foster a Sustainability
Ethic

Meet Test, Training
and Mission
Requirements

Strengthen
Army
Operations



Minimize
Impacts and
Total Costs

Drive
Innovation Enhance Well-
Being

- Save \$ (long-term)
- Social influence & Improved image
- Buying power
- Remove conflict incentives
- Force multiplier
 - Logistics tail
 - Heat, noise signatures





Fort Lewis Sustainability

25 Year Goals (Ver 2- 2007)

- AIR QUALITY
 - Reduce installation source and non-tactical motor vehicle air emissions **85% by 2025**
- ENERGY
 - Reduce total energy consumption by **30% by 2015**
 - **Sustain all activities** on post using renewable energy sources and generate all electricity on post by **2025**
- SUSTAINABLE COMMUNITY
 - **Create sustainable neighborhoods** for a livable Fort Lewis community that enhances the Puget Sound Region
- PRODUCTS AND MATERIALS
 - Cycle all material use to achieve **ZERO new waste by 2025**
- SUSTAINABLE TRAINING LANDS
 - **Maintain the ability** of Fort Lewis to meet it's **current and future military missions** without compromising the integrity of natural and cultural resources, both on the installation and regionally
 - **Recover all listed and candidate federal species** in South Puget Sound Region
- WATER RESOURCES
 - **Treat all wastewaters to Class A reclaim standards by 2025** to conserve water resources and improve Puget Sound water quality



Implementation at Fort Lewis - Integration



Installation Sustainability Program

Cross functional teams,
leadership board

DRIVEN BY:

- Strategic Planning
- New Army Env. Strategy
- Started in Feb 2002
- **Good Common Sense**

From Lofty
Goals

ISO 14001 Environmental Management System

Operating permits,
structured processes

REQUIRED BY:

- Operational Implementation
- Executive Order
- Cert since Sept 2000
- **Good Business Sense**

Into
Daily
Work



Sustainability Management System

- 5-year Plan with objectives
- Annual Targets each FY
- **Funded Projects**



Achieve Zero Net Waste

~ From Cradle to Cradle



Composting w/ Wood Waste

Making
Compost



Waste Wood From
Demolition and grinding Compost Ready For Use

Reuse of Aggregate Material



Asphalt pile from
airfield runway
renovation



Same asphalt - new life
stabilizing a tank trail

Deconstruction

- Contract Incentives
- 100% Recovery



Composting & concrete/asphalt
recycling saves \$756,000/yr

- Disposal cost avoided
- New product purchase cost avoided



ZERO Fossil Fuels



- $\frac{3}{4}$ conservation, $\frac{1}{4}$ renewable





Air/Energy “low hanging fruit”



Conserving energy and reducing air emissions...

... moving away from petroleum-based fuels and using renewable energy sources...

- GSA vehicle fleet 47% Alt fuel capable
- Alternate Fueling Stations
- 24 Neighborhood Electric Vehicles (NEV)
- Rideshare program
- Conserve
 - LED traffic lights, heat pumps
 - Bldg envelopes
- Commission Renewable Energy Study
- Green power purchases
 - 21% (FY07 –FY10) from renewable sources
- Innovative energy systems
 - Solar wall
 - Energy from decomposition of waste





Hydrogen Demonstration Project



- DLA project
- \$4-6M FY08
- Formulates Hydrogen from WWTP digester
- Converts forklifts to Hydrogen fuel cell
- Hydrogen fuel cell shuttle bus
- Mobile refueler





New Construction ~ Minimal Impact on the Environment



Heat Recovery
from Dryer Vents



Covered Bike Racks and
Recycling Station



Native Landscaping – drought
tolerant



Recyclable
Carpet Tile

- Direct Digital Controls- remote control for energy savings
- Finished concrete flooring
- Compact fluorescent lights
- Zero VOC paints and adhesives
- 20% of materials manufactured locally



Energy Star Horizontal
Axis Washers



Underground Water
Cistern



Plastic Lumber Picnic
Tables



Permeable wash pad

Paul Steucke/253.966.1760/paul.steucke@us.army.mil

Slide 12 of 34

3 September 2008



More than just the Buildings:

Building a Sustainable Community



Sustainable Master Planning Goal: Create sustainable neighborhoods for a livable Fort Lewis community that enhances the Puget Sound Region



Building



Installation

Current Real Property Master Plan Revision based on principles of sustainable community design

**American Institute of Architects
10 Principles for Sustainable
Communities**

1. Design on a Human Scale
2. Provide Choices
3. Encourage Mixed-Use Development
4. Preserve Urban Centers
5. Vary Transportation Options
6. Build Vibrant Public Spaces
7. Create a Neighborhood Identity
8. Protect Environmental Resources
9. Conserve Landscapes
10. Design [Excellence] Matters



Neighborhood



Region



Fort Lewis 2017

Planning Vision and Design Principles

Paul Steucke/253.966.1760/paul.steucke@us.army.mil

Slide 14 of 34

3 September 2008

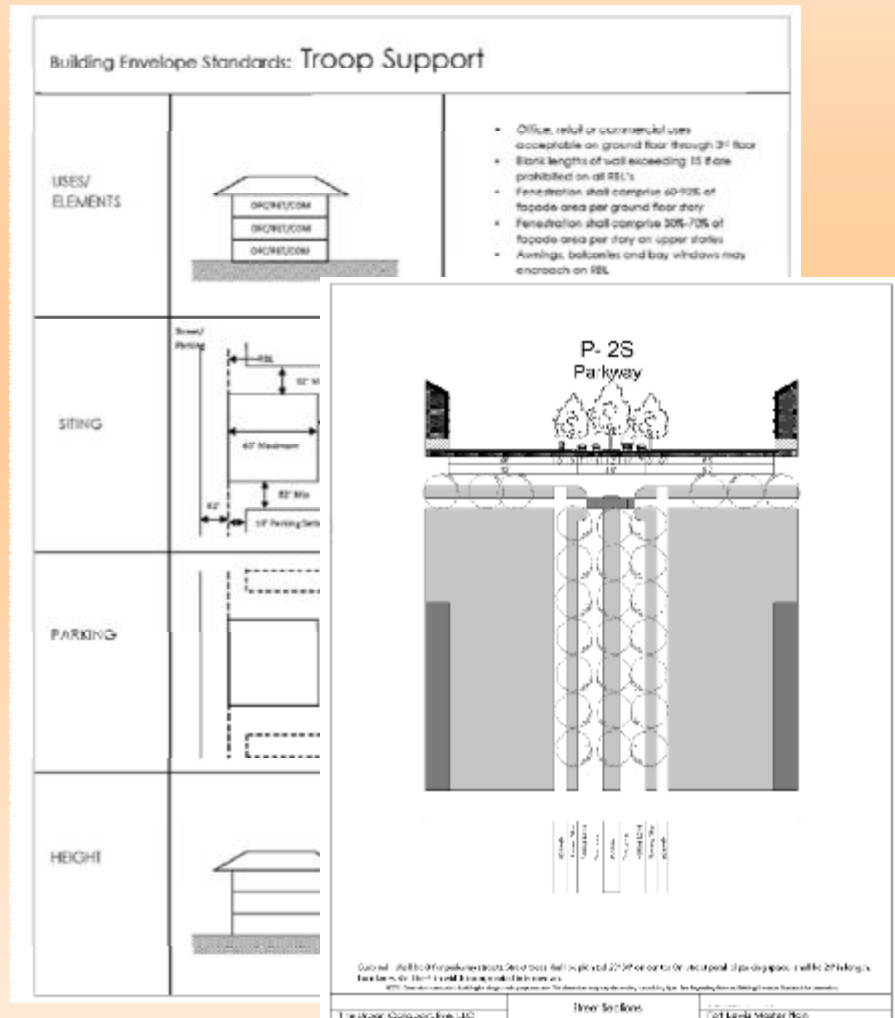


Key Master Plan Products



Regulating Plan

Form-based Code





Fort Lewis Master Plan:

32 Design Principles



Compact Development
Efficient Transportation
Affordable Development
Visible Entries / Optimum Unit Layout
Close-In Training
Rangeland Preservation
LEED facilities
Linear Parks
Hidden Parking
Mixed-Use
Multi-Story Buildings
Public Transit
Bike-Able / Bike Paths
Compact Development
Efficient Transportation
Affordable Development
Visible Entries / Optimal Unit Layout
Close-In Training
Rangeland Preservation
LEED facilities
Linear Parks

Hidden Parking
Mixed-Use
Multi-Story Buildings
Public Transit
Bike-Able / Bike Paths
Sidewalk Buildings
Connected Sidewalks
Aligned Entries
Shop Fronts
Great Views
Main Street
Clear Edges
Town Square
Regional Character / Design Excellence
Focal Points
Multi-Way Boulevard
On-Street Parking
Street Cafes
Bulb-Outs
Street Trees
Parkways
Street Grid



Fort Lewis Master Plan:

Applying the Design Principles



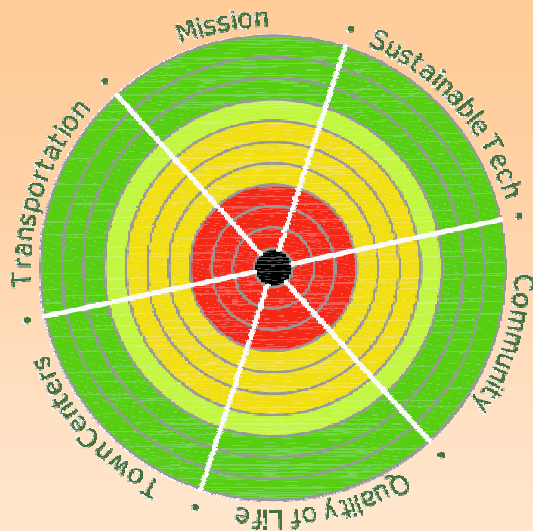
2008 Score (.25, .50, .75, .95)	2017 Score (.25, .50, .75, .95)	DESIGN PRINCIPLE	INTENT	1. Enhance Mission	2. Sustainable Community	3. Walkable	4. Identifiable Town Center	5. Great Streets	Mission	Community	Environment	CRITERIA
		Efficient Transportation	Makes the commute less frustrating; enables less time in cars; improves safety, force protection and facilitates rapid deployment of people and equipment.	X	x				x	x	x	Provide high frequency transit within a 5 minute walk of 75% of the neighborhood population. All roads score "C" or better for transportation level of service.
		Affordable Development	Minimizes initial infrastructure costs and future maintenance costs of roads, utilities and stormwater management; careful analysis choosing building materials to ensure proper balance between cost and long-lasting construction.	X	x				x	x	x	Score full point if all streets contain utility corridors.
		Visible Entries (including site layout)	Makes finding the front door easy. Entries should be visible from all directions and lines of sight.	X		x		x	x	x		Score full point if all unit facilities are laid out to maximize unit effectiveness.
		Close-In Training	Appropriate training areas located within the cantonment area; open areas for PT and other daily outdoor training close to company operations	X		x			x		x	All units are within 10 minute walk of an adequately sized CIT.
		Rangeland Preservation	Mission critical activity; no encroachment acceptable	X					x		x	Neighborhood has not expanded beyond 2008 cantonment area boundaries. (Similar to urban growth boundary.)



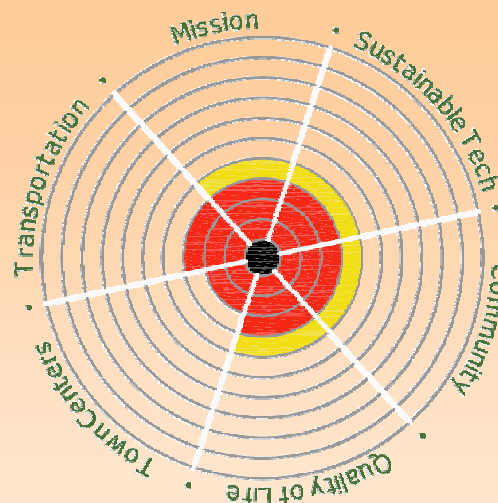
MEASURING SUSTAINABILITY



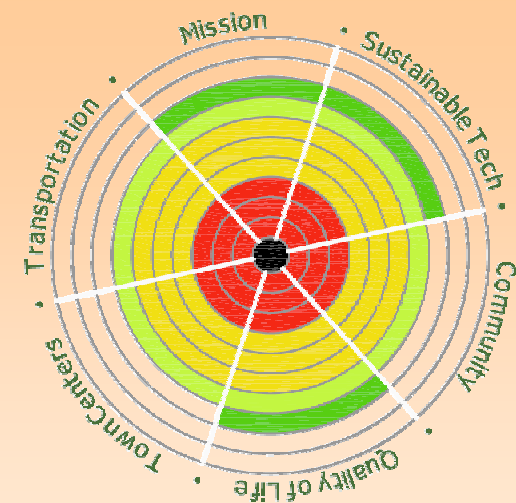
- Uses the 32 Master Plan Design Principles
 - Ensures consistent implementation of sustainable principles
 - Tie in to planning goals
 - Enhance Mission
 - Sustainable Community
 - Walkable Neighborhoods
 - Identifiable town centers
 - Great Streets
 - Includes LEED-NC and LEED-ND



Goal



Overall Fort Lewis
2008



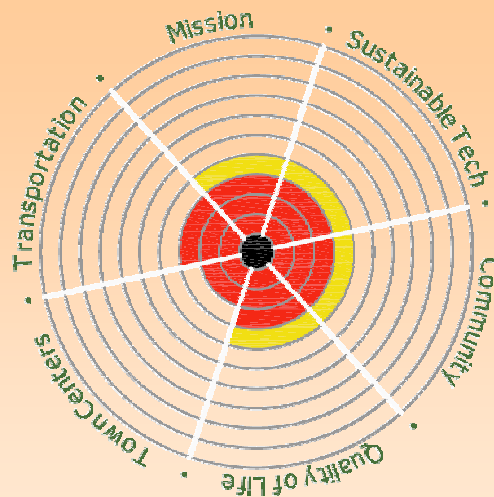
Overall Fort Lewis
2017



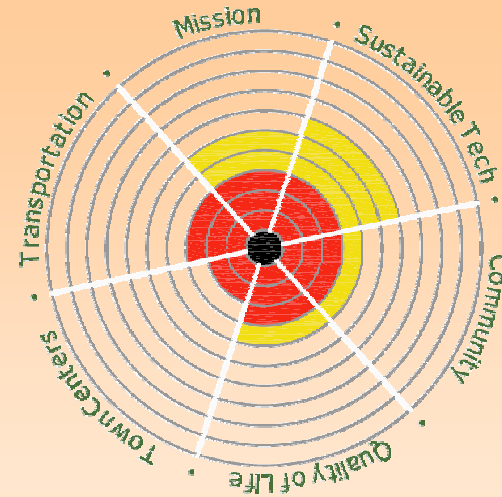
Energy Savings



- OSD Study “More Fight, Less Fuel”
 - Conservation
 - Renewable Energy
- \$20M spent on energy in 2007 for Fort Lewis facilities
- ~\$18M investment coupled with utility rebates/incentives will save ~28% of Fort Lewis energy (payback of 3.6 years)



Overall Fort Lewis
2008



Overall Fort Lewis
w/ energy savings



Lighting – Utility Energy Savings Contract



Lighting contributes to:

- Security / safety
- Mission capability / productivity
- Creating gathering places
- Sustainability through walkability
- Sustainability through energy savings
- Fort Lewis is partnering with Bonneville Power Administration (BPA)
- Approx \$176K in annual energy savings from upgrading vehicle maintenance facility lighting
- Overall projected lighting savings with upgrades: \$885K/year



Poorly lit parking



Well lit parking



Fort Lewis Ground Source Heat Pump (GSHP) conversion



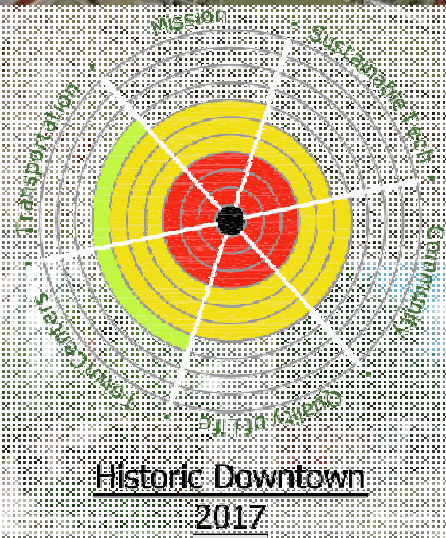
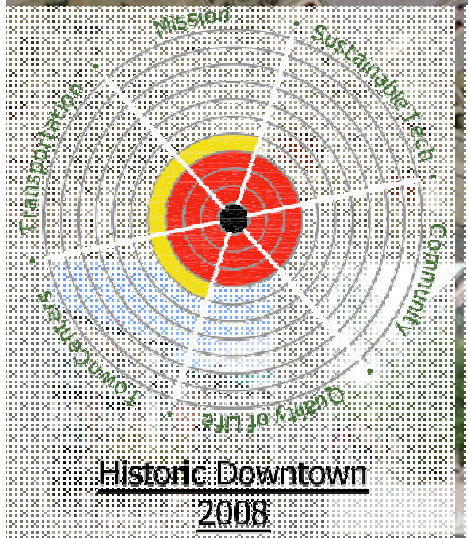
- Long range plan: Cut Ft. Lewis heating costs in half using GSHPs
 - Natural gas heating costs Fort Lewis \$10.4M/yr
 - \$5.2M/yr est. savings (196,600 MWH/yr)
 - Saves energy & money, easier maintenance, renewable energy credit and provides better building occupant comfort (summer cooling)
- Major barriers to this project include:
 - Cultural resistance from workforce due to lack of familiarity with GSHPs.
 - Solution: Include initial 10 yrs of maintenance into contract
 - Add GSHP into design guidelines
- BPA (Ft. Lewis' UESC partner) performing a GSHP feasibility study
 - Recommended initial project:
 - 114,421 sq feet in 5 bldgs
 - Capital cost of \$385k and 11k annual maintenance cost
 - Saves \$64k per year (6,641,000 MBTU/yr) with 7.3 yr simple payback



Town Center – Fort Lewis Downtown



Lessons Learned: -Partnering is critical to plan success



Downtown

Proposed Buildings

September 2008



The Sustainable Downtown



Green roofs

Reduce stormwater runoff, reduce cooling loads for large retail facilities, improve low-slope roof longevity and reduce the heat island effect



Renewable Energy

Large retail roofs can be an ideal location for photovoltaic (solar) panels that produce electricity from sunlight



Permeable Paving

Reduces stormwater runoff and the resultant need for large retention facilities, infiltration is also increased preserving more of the natural hydrology.



Daylighting

Photo credit: Wal-Mart Stores, Inc

Skylights and clerestory windows with lighting controls that "harvest" daylight significantly reduce energy use and make a more pleasant indoor environment

Fort Lewis 2017

Fort Lewis – a few of the proposed sustainable development technologies

Paul Steucke/253.966.1760/paul.steucke@us.army.mil

Slide 23 of 34

3 September 2008



FORT LEWIS



MAIN STREET

Fort Lewis 2017

New Downtown Lifestyle Center

Paul Steucke/253.966.1760/paul.steucke@us.army.mil

Slide 24 of 34

3 September 2008



The Little Blue Engine

by Shel Silverstein (1932-1999)





Original Concept: Break thru the “Chicken or the Egg”

- **Permanent Alternate Fueling Station by 2012**
 - Sited to benefit Puget Sound Community
 - Federal property – I-5 Corridor
 - BC to BC HH
 - Preliminary work with Federal/State/Private
 - Corporate (public/private) operation
 - Federal/State fleet use
 - Available to the community
 - Trans- regional potential - may bring EPA grant money
 - Biodiesel, E-85, Supr Chrg, CNG(?) & Hydrogen (future)





Fort Lewis Alternate Fueling Facility (AFF) Project



Congressional MCA “earmark” for FY08

- **Project Fun Facts ~**

- Have \$2.9 M to build a \$6.6M facility.
- Originally planned for FY12, but now must execute in FY08/09.
- Every potential location has serious flaws.
 - * traffic congestion, right-of-way, access, annexation, utilities access, sloped terrain, visibility, etc.)
- Potential conflicts with AAFES Fuel sales
- No partner to act as operator identified

- **In Essence: underfunded, overbudget, behind schedule, and scantily scoped.**

Just your standard “Jo-Jo the dog-faced boy” project



Going beyond compliance



A few select laws/regs/orders...

- Energy Policy Act
- Energy Ind. Act (WA)
- Executive Order 13423
- Clean Air Act
- Endangered Species Act
- Clean Water Act
- HB 2738, 1303, & SB-6001 (WA)
- RCRA & RCW 70.95.010

the criteria...

- 15% renewable by 2020
- 2% biodiesel & ethanol by 2008
- Critical Habitat for listed species
- 50% waste diversion rate
- NPDES permit discharge stds.

the Ft. Lewis goal,

- 100% renewable by 2025
- 100% by 2025
- Recover all listed and candidate
- Zero net waste
- Class A reclaim stds.

& progress to date.

- 21% renewable & solar/wind gen. study
- 83% biodiesel (B20) & 14% ethanol (E85)
- ACUB & CCA for species of concern
- 72% of “waste” stream is reused or recycled
- Pretreatment program/reuse study/pilot



Some Progress to date



A few select examples:

EPA Performance Track membership

Eliminate Title V Air Operating Permit

Eliminate RCRA TSDF Permit

Material reuse/composting facility

Wetlands construction for stormwater treatment

Model Motor Pool

The (triple) Bottom Line:

Community

- 30+ positive media reports pr year
- 14 community awards received past 4 yrs
- 35 local relationships built
- 4 community events per yr

Environment

- 2364 acres decontaminated
- 23,000 tons of waste reused
- 40,000 MBTU saved/generated
- 3,400 acres habitat improved on & off post apiece
- 0 NOVs last 4.5 years

Financial

- \$1.1M saved or made (onetime net)
- \$886,000 saved or made (annual net)



Being a part of the solution

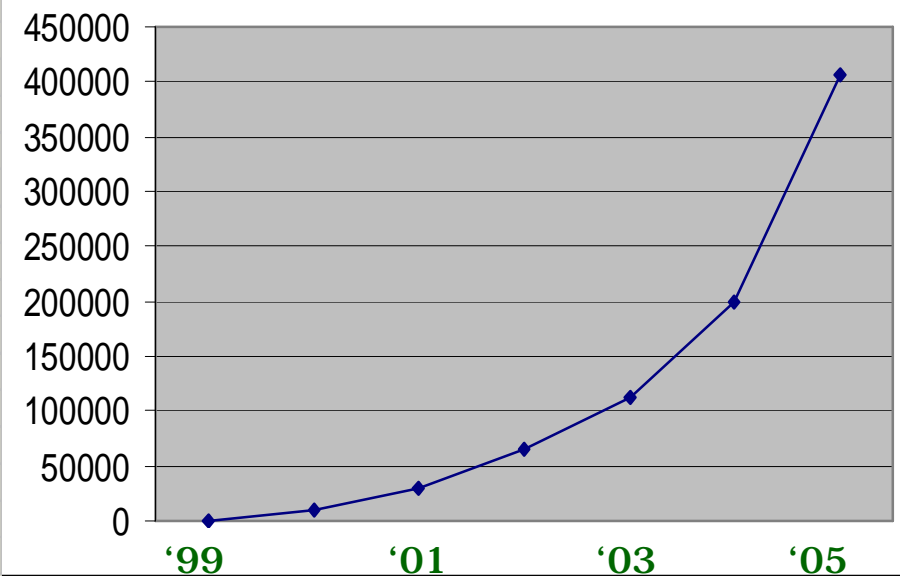


“Little Things Can Make a Big Difference”

- Malcolm Gladwell, *The Tipping Point*



Cumulative Hybrid Auto sales 1999 to 2005



The Power of One Person + The Power of Exponential Growth in Culture Change

Again, the Technology Exists!



Fostering a Sustainable Culture



- Education (video)
- Web site
- Branding
 - Part of the solution...
 - Logo (window clings)
 - Signs

What did you do at work today, daddy?



- Signing a commitment statement.

“I commit to making a sustainable Fort Lewis, Army, and planet a priority in my life.” - (Signed) COL I.M. Onboard



<https://sustainablefortlewis.army.mil/>



Will we succeed?



- I don't know
- I know We won't quit
- Edison
- Fear
- Parenthood
- NGUNNGU



The Little Blue Engine:

The Rest of the Story



“Argue for your
limitations, and sure
enough, they are
yours”

-Richard Bach

