

Current Practices

- ▶ Degraded air quality
- ▶ Depleting water and other natural resources
- ▶ Global warming and climate change
- ▶ Energy dependence
- ▶ Inaccessibility to energy sources
- ▶ Cost of living

Unsustainable

Our Goal - the Triple Bottom Line

- ▶ **Social -**
Maintain or improve quality of life
- ▶ **Economic -**
Live more efficiently & economically
- ▶ **Environmental -**
Preserve resources for future generations

Suggested Action Areas

Green Team –

- **Grassroots and cross-functional volunteers**
 - Employees
 - Local citizens and Organizations
 - Supported by the management
- **Educate, inspire and empower others around sustainability**
- **Identify and implement specific solutions to operate in an environmentally sustainable fashion**
 - Plan and coordinate
 - Implement
 - Track and monitor



Green Team

Strategy Case study – Rutland County, Vermont

Home Efficiency Assistance Team (H.E.A.T.) Squad:



Goal: Develop public interest in energy efficiency

- ✓ Worked with local organizations across the towns
- ✓ Direct outreach
- ✓ Personalized home visits
- ✓ Phone-a-thon



Results:

- 42% of targeted homeowners contacted first night
- 51% of contacted homeowners participated in energy efficiency improvement

Energy – Significant impact on our lives and economy



- ▶ Typical US household utility bill = \$1900/yr
- ▶ US Government utility bills (Washington DC Area):
 - Dept. of Labor: July 2010 utility bill > \$1 Million
 - Dept. Health & Human Services: Aug 2010 = \$799,000
 - Most federal departments: monthly utility costs > \$200,000

(The Washington Post – Federal Eye, 1/25/2011)

▶ Case Study: Intercontinental Hotels

- Switched light bulbs on their properties
- Investment = \$400,000
- Savings = \$1.2 million over four months



www.GreenImpact.com

Energy Profiles

Costs based on energy usage

Essex County (2010):

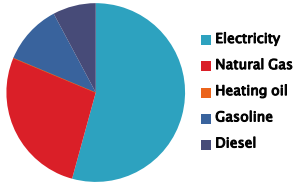
Electricity – \$2,897,652

NG – \$1,235,010

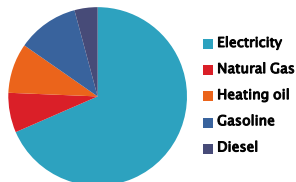
Vehicle Fuel – \$459,881

Emissions (%) based on energy usage

Union County (2008)



City of New Brunswick (2009)



Energy Audits

- ▶ Municipal buildings
- ▶ Community



Funding/Grant opportunities

- NJBPU – Local Government Energy Audits
- NJ Clean Energy Program – Direct Install

Case Study: UMDNJ – Energy Efficient Chiller Project

- Funded by PSE&G's \$79 million Hospital Efficiency Program
- Project Cost ~ \$11 M
- UMDNJ's share ~ \$3M
- Will reduce UMDNJ's annual utility bill by about \$1.3 million

www.nj.com/business/index.ssf/index_3.html



Energy reduction/efficiency programs

Electricity use

- Demand response program
- Energy Star program



HVAC zoning & thermostat control

High Efficiency/LED lighting

- Case Study: New Brunswick (2009) – Street lights & traffic signals = 20% of Municipal electricity use

Efficiency driven funding

Energy Savings Improvement Program (ESIP)

- 2009 State Law – Government agencies
- Allows energy related improvements
- Pay for costs using the value of energy savings

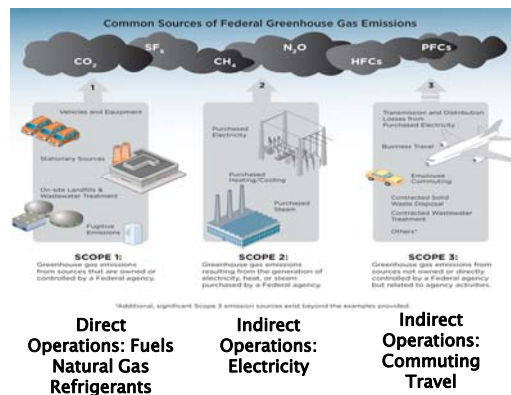


Greenhouse Gases

- ▶ Six gases: CO₂, CH₄, N₂O, and 3 fluorinated gases
- ▶ Generated by human activities
- ▶ Global warming potential
 - Climate change
 - Severe weather conditions
 - Melting glaciers
 - Rising ocean levels



Common sources of GHGs:



Greenhouse Gases

- ▶ **Baseline Analysis**
 - Starting point
- ▶ **Municipal Footprint**
 - Relatively easy to do
 - Typically **3–10%** of overall community footprint
- ▶ **Community footprint**
 - More challenging
 - Greater impact
- ▶ **Emission sources:**
 - Energy usage
 - Transportation
 - **Water facilities: 20–25% GHG emissions from municipal water treatment**
 - Solid waste disposal



Vehicle Fleet

▶ Evaluate fleet fuel consumption & efficiency

▶ Green Fleet

- Hybrids
- Electric
- Flex Fuel (E85)
- NG/Propane



Your FRIES
Give me GAS!



▪ Alternative fuels

- Bio-fuels – B20 – usable on all diesel vehicles – state rebate programs
- Vegetable oil – for off-road vehicles and equipment only

Vehicle Fleet

▶ Case Study: Edison, NJ

- 38 Hybrid vehicles (sedans & SUVs)
- Estimated saving in fuel costs: \$70,000 per year

▶ Additional saving on hybrids with rebates and subsidies

- County Programs
- NJ SEP: Alternative Fuel Vehicle Program
- NJBPU: Alternative Fuel Infrastructure Program



Vehicle Fleet

▶ Green Fleets Suggested Targets

- Average fleet fuel efficiency 35 miles/gallon – light duty vehicles

Or

- 20% reduction in fuel usage within four years of a documented baseline.



Green Purchasing



- ▶ Adopt Green Purchasing Policy
- ▶ Green Electric Power
- ▶ Recycled paper/other products
- ▶ Cleaning supplies/solvents

<http://purchasing.rutgers.edu/green>

- Improved health & safety
- Reduction in VOCs

- ▶ Buy local

- Economic benefits
- Social benefits
- Environmental benefits



Greening our Behavior

Adopt behavioral policies:

- ▶ Anti-Idling policy
 - Case Study: Hamilton, NJ:
18-23% reduction in fuel use
- ▶ Eliminate unnecessary trips
- ▶ Car pool/ride share
- ▶ Energy Policy – Turn off lights, computers, copiers, printers when not in use
- ▶ Adjust thermostat to lower energy



Solid Waste Management

- ▶ Municipal operations
- ▶ Community program/involvement



Solid Waste Management

Prevention/Reduction

- Material sourcing – (Do I really need that?)
 - Necessary?
 - Locally sourced?
 - Versatile?
 - Durable?
 - Easy maintenance?
 - Safe?
 - Recycled content?
 - Recyclable?



- Default to double-sided printing
 - Cuts paper budget nearly in half

- Equipment Sharing (Shared Services & Loaners)
 - Eliminates need for additional machinery
 - Case Study: East Orange
 - Power Tool Library for Residential use



Solid Waste Management

Waste Audit for municipal buildings & schools

- Case Study: Bates College waste audit
 - Solid waste streams: 74% trash; 26% recycling
 - >25% of trash could have been recycled
- Cost savings from lower disposal fees and increased rebates from sales of recyclables

Electronic waste

- Fastest growing waste stream (lead, mercury, chromium cadmium, rare earth metals, etc.)
- >90% electronic equipment is recyclable

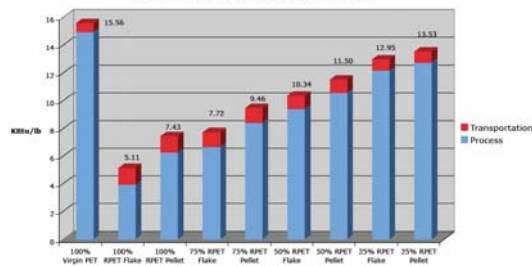


Recycling

- Single-stream vs. Dual stream
 - Single-stream recycling increases participation by 30% or more
 - Single-stream saves 0.901 tons CO₂eq per ton generated

Plastics: Recycled vs. Virgin

Comparison of Virgin PET and Varying Levels of Recycled PET:
Expended Energy
(Process and Transportation) Does not include Inherent Energy

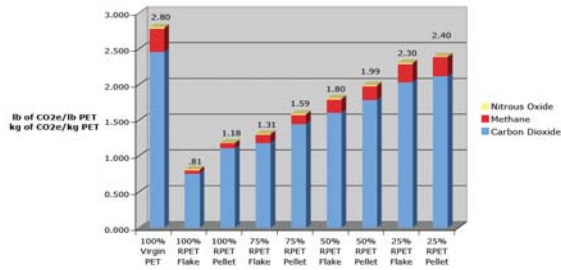


Sources:
Final LCI for RPET and RPET - April 7, 2010 - GWP for Methane is 25, for N2O is 295, PER IPCC 2007.
RPET data is based on volume based collection with 50% compaction and the cut-off recycling allocation methodology.
Note: Comparisons between different polymers need to be on the basis of a common package not by the burden per pound as shown here.

www.napcor.com/pdf/NAPCOR_LCIcharts.pdf

Plastics: Recycled vs. Virgin

Comparison of Virgin PET and Varying Levels of Recycled PET:
GHG Emissions



Sources:

Final LCI for RPET and RHOPRE - April 7, 2010 - GWP for Methane is 25, for N₂O is 298, PER IPCC 2007

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Solid Waste Management

Food Composting (27% of MSW)

- ▶ Local (on-site) composting
 - Residential backyard composting bins
 - Enclosed composters for facilities
- ▶ Regional facilities
 - Organic Diversion (DE), AgChoice (NJ),
- ▶ Benefits:
 - Production of Compost and Fertilizer;
 - Cheaper alternative to disposal
 - Educational tool - schools, public.



Solid Waste Management

Vegetative Composting (5-50% of MSW)

- ▶ Reduced transportation/disposal costs
- ▶ Reduced need for retail compost/topsoil
- ▶ Distribute finished material to residents
- ▶ Natural alternative to chemically altered and manufactured compost
- ▶ Contractor "buy"-in
- ▶ Case Study: Essex County Utilities Authority
 - Contractor pays County \$250,000 over two years to operate 3-acre compost/transfer site
 - Charges market rate to commercial tipplers
 - Municipalities can reduce current expenses of ~\$1,000,000 per year



Solid Waste Management

Organics (FOG)

Fat/Offal, Yellow Grease, Brown Grease

- ▶ Beneficial reuse
 - Fuel (Vehicles & Equipment)
 - Heat (Used oil heaters)
 - Power (Vegewatt)
 - Energy (CH_4)
 - Cosmetics
- ▶ Municipalities avoid clogged pipe costs
- ▶ Generators reduce disposal costs
- ▶ Case Study: Bergen County Utilities Authority



Water Conservation/Re-use/Recharge

- ▶ Green design
 - Pervious paving
 - Stormwater bump-outs
 - Green roofs
 - Stormwater tree trenches
- ▶ Community Education
 - Turn off the tap
 - Low flow showerheads
 - Low-flush toilets
 - Rain barrels & Cisterns

Bump-out



Tree Trench



A series of trees connected by an underground infiltration system.

Land Use

Brownfields to Greenfields

- ▶ EPA's Brownfields Program:
 - www.epa.gov/brownfields/grant_info/index.htm
 - helps communities assess, clean up, redevelop, and reuse contaminated properties
 - provides direct funding, revolving loans, and environmental job training

Backyard & Community Habitats

www.nwf.org/Get-Outside/Outdoor-Activities/Garden-for-Wildlife.aspx

- ▶ Reducing or eliminating chemical fertilizers and pesticides
- ▶ Conserving water
- ▶ Planting native plants
- ▶ Removing invasive plants
- ▶ Composting



Transportation

Smart Planning

- ▶ City Centers
- ▶ Mass transit
- ▶ Walk-ability & Bike-ability
- ▶ Route Optimization (Heuristic Routing)
- ▶ GPS Planning – Monitoring
- ▶ Traffic Patterns
- ▶ Smart Lights
- ▶ Battery Charging Stations
- ▶ Priority Parking

Smart Policy

- ▶ Telecommuting

Climate Action Plan

- ▶ Energy
- ▶ Transportation
- ▶ Purchasing
- ▶ Solid waste
- ▶ Water use
- ▶ Community Planning



Sustainable Jersey



- ▶ Voluntary certification program for municipalities that
 - ✓ Go green
 - ✓ Save money, and
 - ✓ Take steps to sustain quality of life
- ▶ Save money. Get money.
 - Implement actions leading to cost savings: (energy, water, garbage bills)
 - Improve efficiency, cut waste, stimulate local economy
 - Access to incentives and grants
- ▶ Gain access to training, tools and expert guidance.
 - Get recognized. Promote your town.
 - Conserve valuable resources. Protect the environment.

Sustainable Jersey References

The preceding Action Areas can help you attain the following points toward Sustainable Jersey certification:

- ▶ Green Team – 10 pts
- ▶ Community Education and Outreach – up to 40 pts
- ▶ Energy Audits – 10 pts
- ▶ Municipal/Community Carbon Footprint – 10 pts ea
- ▶ Climate Action Plan – 10 pts
- ▶ Buy Local – up to 20 pts
- ▶ Support Local Food – up to 40 pts
- ▶ Green Purchasing – up to 55 pts
- ▶ Green Fleets – up to 70 pts
- ▶ Behavioral Policies – 5 pts
- ▶ Recycling & Waste Reduction – up to 120 pts

Resources

- ▶ Sustainability
 - Sustainable Jersey – www.sustainablejersey.com
- ▶ Energy
 - NJBPU – www.state.nj.us/bpu
 - NJ Clean Energy – www.njcleanenergy.com
- ▶ Water
 - NJBPU – www.state.nj.us/bpu
- ▶ Solid Waste & Recycling
 - Association of NJ Recyclers – www.anjr.com
 - Rutgers Solid Waste Resource Renewal Group – swrrg.rutgers.edu
 - NJ WasteWise – www.nj.gov/dep/dshw/recycling/wastewise/brbn03.htm
 - USEPA WasteWise – www.epa.gov/epawaste/partnerships/wastewise/index.htm
- ▶ Green Purchasing
 - Rutgers – <http://purchasing.rutgers.edu/green>
 - EPA Environmental Preferred Purchasing – www.epa.gov/opptintr/epp/pubs/relatedfed.htm

Questions??

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