Leading to Sustain

Waukesha County Sustainability Plan 2008-10

Sustainable Initiatives

- Building Design and Operation
- Grounds and Site Management
- Land Use and Environment
- Purchasing and Employees
- Transportation

Building Design and Operation

- LEED Certification Overview
- Parks Projects
- DPW Projects
- Construction and Demolition Waste Recycling

LEED (Leadership in Energy & Environmental Design)
Guidelines for Green Building Design

- Sustainable Sites
  - Site Selection, Reduced Site Disturbance
  - Erosion Control, Stormwater Management
  - Landscape Design to Reduce Heat Islands
  - Reduce Light Pollution
- Water Efficiency
  - Water Conserving Landscaping
  - Innovative Wastewater Technologies
  - Reduce Water Use
- Energy & Atmosphere
  - Optimize Energy Performance, CFC Reduction
  - Renewable Energy Systems, Green Power

LEED (Leadership in Energy & Environmental Design)
Guidelines for Green Building Design

- Materials & Resources
  - Building Reuse, Store & Collect Recyclables
  - Construction Waste Management, Resource Reuse
  - Recycled Content, Local/Regional Materials
  - Rapidly Renewable Materials, Certified Wood Products
- Indoor Environmental Quality
  - Tobacco Smoke Control, CO_2 Monitoring
  - IAQ (Indoor Air Quality) Performance & Management
  - Low Emitting Materials, Controllability of Systems
  - Thermal Comfort, Daylight and Views
- Innovation & Design Process
  - Unique Characteristics & Processes
  - Use a LEED Accredited Professional

LEED-NC: Can-Do Scorecard

29	33	7	Total Project Score	Possible Points: 69

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

Sustainable Sites — Possible: 14 Points

Easy	Mod.	Diff.			
8	3	3			
Y			Prereq 1	**Erosion and Sedimentation Control**	
1			Credit 1	**Site Selection**	1
		1	Credit 2	**Urban Redevelopment**	1
		1	Credit 3	**Brownfield Redevelopment**	1
		1	Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
	1		Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
	1		Credit 4.3	**Alternative Transportation**, Alternative Fuel Refueling Stations	1
	1		Credit 4.4	**Alternative Transportation**, Parking Capacity	1
1			Credit 5.1	**Reduced Site Distrubance,** Protect or Restore Open Space	1
1			Credit 5.2	**Reduced Site Distrubance,** Development Footprint	1
1			Credit 6.1	**Stormwater Management,** Rate or Quantity	1
1			Credit 6.2	**Stormwater Management,** Treatment	1
1			Credit 7.1	**Landscape & Exterior Design to Reduce Heat Islands,** Non-Roof	1
1			Credit 7.2	**Landscape & Exterior Design to Reduce Heat Islands,** Roof	1
1			Credit 8	**Light Pollution Reduction**	1

Water Efficiency — Possible: 5 Points

Easy	Mod.	Diff.			
4	1				
1			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
1			Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
	1		Credit 2	**Innovative Wastewater Technologies**	1
1			Credit 3.1	**Water Use Reduction**, 20% Reduction	1
1			Credit 3.2	**Water Use Reduction**, 30% Reduction	1

Energy & Atmosphere — Possible: 17 Points

Easy	Mod.	Diff.			
4	13				
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	
Y			Prereq 2	**Minimum Energy Performance**	
Y			Prereq 3	**CFC Reduction in HVAC&R Equipment**	
2			Credit 1.1	**Optimize Energy Performance:** 20% New / 10% Existing	2
	2		Credit 1.2	**Optimize Energy Performance:** 30% New / 20% Existing	2
	2		Credit 1.3	**Optimize Energy Performance:** 40% New / 30% Existing	2
	2		Credit 1.4	**Optimize Energy Performance:** 50% New / 60% Existing	2
	2		Credit 1.5	**Optimize Energy Performance:** 60% New / 50% Existing	2
1			Credit 2.1	**Renewable Energy:** 5%	1
	1		Credit 2.2	**Renewable Energy:** 10%	1
	1		Credit 2.3	**Renewable Energy:** 20%	1
	1		Credit 3	**Additional Commissioning**	1
1			Credit 4	**Additional CFC Reduction**	1
	1		Credit 5	**Measurement & Verification**	1
	1		Credit 6	**Green Power**	1

Materials & Resources — Possible: 13 Points

Easy	Mod.	Diff.			
5	5	3			
Y			Prereq 1	**Storage & Collection of Recyclables**	
		1	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Shell	1
		1	Credit 1.2	**Building Reuse**, Maintain 100% of Existing Shell	1
		1	Credit 1.3	**Building Reuse**, Maintain 100% of Shell & 50% Non-Shell	1
1			Credit 2.1	**Construction Waste Management**, Divert 50%	1
1			Credit 2.2	**Construction Waste Management**, Divert 75%	1
	1		Credit 3.1	**Resource Reuse**, Specify 5%	1
	1		Credit 3.2	**Resource Reuse**, Specify 10%	1
1			Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1
1			Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1
1			Credit 5.1	**Local/Regional Materials**, 20% Regional	1
	1		Credit 5.2	**Local/Regional Materials**, Of 20% Above, 50% Local	1
	1		Credit 6	**Rapidly Renewable Materials**	1
	1		Credit 7	**Certified Wood**	1

Indoor Environmental Quality — Possible: 15 Points

Easy	Mod.	Diff.			
7	7	1			
Y			Prereq 1	**Minimum IAQ Performance**	
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	
		1	Credit 1	**Carbon Dioxide (CO2) Monitoring**	1
	1		Credit 2	**Increased Ventilation Effectiveness**	1
1			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
1			Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
1			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
1			Credit 4.2	**Low-Emitting Materials**, Paints	1
1			Credit 4.3	**Low-Emitting Materials**, Carpet	1
1			Credit 4.4	**Low-Emitting Materials**, Composite Wood	1
	1		Credit 5	**Indoor Chemical & Pollutant Source Control**	1
	1		Credit 6.1	**Controllability of Systems**, Lighting	1
	1		Credit 6.2	**Controllability of Systems**, Thermal Comfort	1
1			Credit 7.1	**Thermal Comfort**, Design	1
	1		Credit 7.2	**Thermal Comfort**, Permanent Monitoring	1
	1		Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
	1		Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

Innovation & Design Process — Possible: 5 Points

Easy	Mod.	Diff.			
1	4				
	1		Credit 1.1	**Innovation in Design**: Provide Specific Title	1
	1		Credit 1.2	**Innovation in Design**: Provide Specific Title	1
	1		Credit 1.3	**Innovation in Design**: Provide Specific Title	1
	1		Credit 1.4	**Innovation in Design**: Provide Specific Title	1
1			Credit 2	**LEED® Accredited Professional**	1

Easy' Credits: Consistently achieved with little work or additional cost. Should always be pursued, and should be standardized in design conventions and specifications.

Moderate' Credits: Have variability based on project type, scope, & environmental and project goals.

Difficult' Credits: Either not applicable to project type or scope, or currently cost prohibitive

Building Design and Operation

- LEED Certification Overview
- Parks Projects
- DPW Projects
- Construction and Demolition Waste Recycling

Building Design and Operation

Parks Division

- **Sustainable Sites**
- Stormwater Management

- **Water Efficiency**
- Water Efficient Landscaping

Building Design and Operation

Parks Division

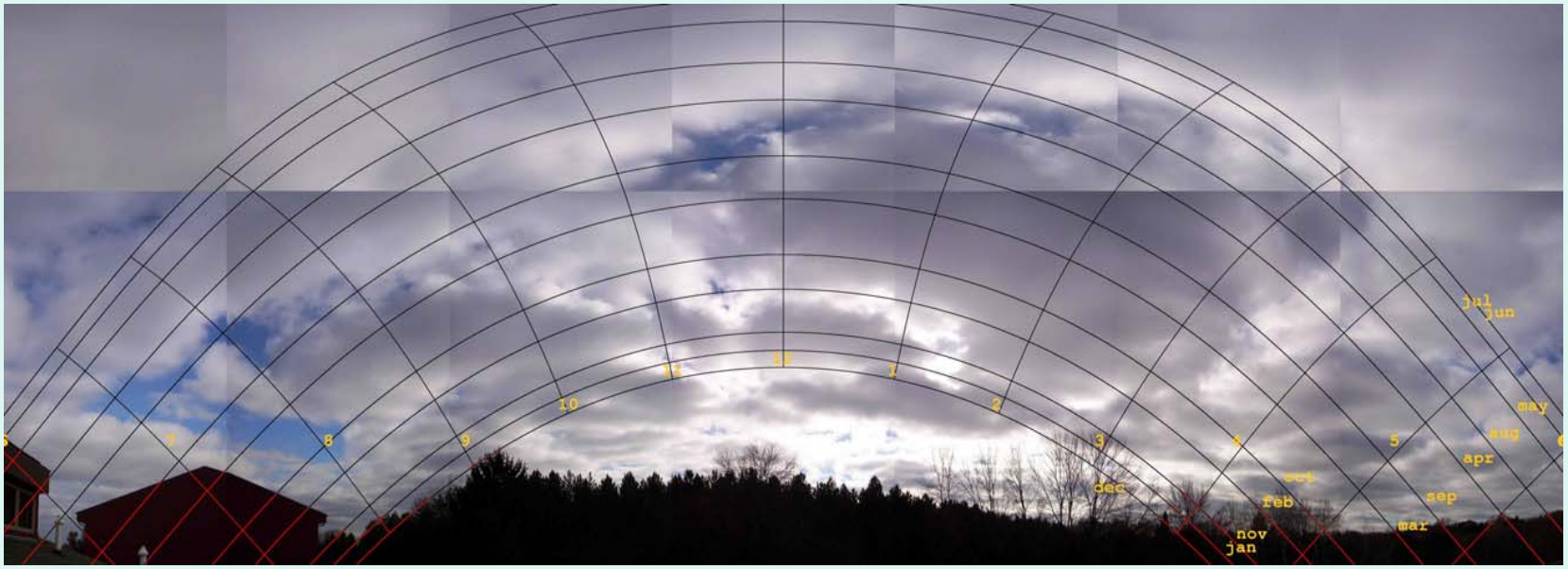
- **Energy & Atmosphere**
- Optimize Energy Performance
- Renewable Energy Systems
- Green Power

Building Design and Operation
Parks Division

- **Indoor Environmental Quality**
- Daylighting, Thermal Comfort

- **Materials & Resources**
- Local Materials,
- Rapidly Renewable Resources

- **Focus on Energy Site Assessments**
- Solar Photovoltaic (PV) electricity generation
- Wind Turbine electricity generation
- Solar Thermal (Hot Water, Space Heating)



Ice Arenas

Geothermal Heat Exchange

- Exchanging ‘heat’ from ice:
  - Efficient Cooling of ice surface
  - Utilize ‘waste’ heat for lobbies, locker rooms, seating areas
- Incentives for Feasibility Studies

Ice Arena Lights

Before

After

Project

- Replaced 400 watt metal halide fixtures with Four-foot T8 Hi-Bay 6-lamp fixtures at Eble and Naga-Waukee Ice Arenas
- Replaced T12 magnetic fixtures with a T8 system.
- Installed sensors in Eble lobby and LED exit signs.

Result

- Happy Customers - Lighting levels were increased from 25 foot-candles to 65 foot-candles.
- Annual Savings - Estimated 117,200 kilowatt hour reduction, or $11,500 per year.

Grant Funding – ROI

$44,000 Costs

($8,900) WE Grant

$36,000 Net Costs

3.1 Years ROI

Building Design and Operation
Parks Division

- Pulling it all together – holistic approach to implementing Renewable systems
- Incentives and Grants available through ‘Focus on Energy’ and WE Energies

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Building Design and Operation

Facilities Management/Operations Goals

- Implement **LEED-EB** Standards for Waukesha County Facilities
- **Retro-commission** County Facilities
- Reduce **Electrical** Consumption
- Reduce Natural **Gas** Consumption
- Reduce **Water** Consumption

Energy Conservation Project

- Waukesha County has approved $600,000 in the 2008 budget for energy conservation projects.
- Process
  - Compile utility consumption data by facility.
  - Benchmark and review facility utility consumption per RSF.
  - Perform a energy audit on existing electrical systems and equipment.
  - Identify opportunities for resource reductions.
  - Develop specifications and construction documents.
  - Bid and manage project completion.
- Work with Focus on Energy to obtain rebates.

Facilities Management
Completed Conservation Projects

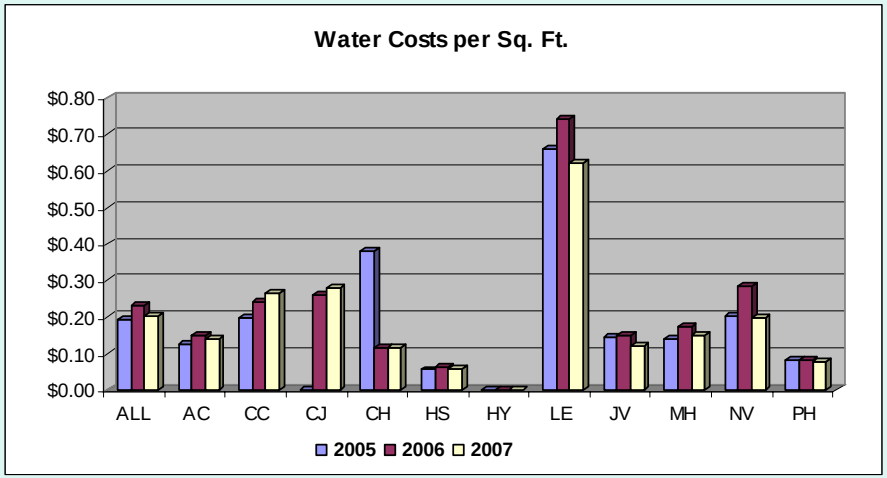
- Public Health Center
  - Approved for Energy Star rating by United States Environmental Protection Agency – Dept. of Energy
- Courthouse Chiller Replacement
  - Est. **15% reduction** in chiller electrical consumption
- Northview Boiler
  - Reduced natural gas consumption **41%**
  - Reduced electrical consumption **5%**

FM Conservation Projects

In Progress

- Law Enforcement Center

  HVAC - Current
  - Estimate $30,000 annual water savings
  - ROI 3.0 years



- Courthouse Boiler Replacement – Current
  - Projected 7% equipment electrical consumption
  - Projected 10% increase in boiler efficiency
  - $7,425 FOE Feasibility Study Rebate
  - $17,682 FOE Grant

FM Conservation Projects

In Progress

- Highway Facilities Lighting
  - Annual savings $13,620 ROI 8.4 years
- Electrical System Sub-metering
  - Will help evaluate system performance and identify opportunities to reduce consumption
- Juvenile Center Boilers
  - Project a 10% increase in combustion efficiency.
  - Reductions in electricity & gas consumption
- Campus Lighting Upgrades
  - High efficiency lighting, LED applications and occupancy sensors

Building Design and Operation

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Governor's Report on Waste Materials Recovery and Disposal - 2006

- Construction and demolition (C&D) debris makes up about 28.7% or 1.4 million tons of Wisconsin's solid waste.

- *<u>Objective:</u> Recover as much of this waste as possible for beneficial reuse/recycling.*

2005 Retzer Nature Center
C&D Recycling Pilot Project

Deconstruction materials from Retzer

- Concrete walkways went to a local quarry.

- Granite fieldstone columns were used outside for retaining walls and a retention pond.

Window Glass, Glass Doors and Panels

Framing uses a <u>lot</u> of wood!

Separate Containers for Materials

- **Cardboard**
- **Clean wood**
- **Scrap metal**

Retzer Project Results

Material	Volume (yd3)	% of Total Volume	Weight (Tons)	% of Total Weight
Cardboard	2	1.12%	2.24	1.59%
Scrap Metal	24	13.45%	4.03	2.86%
Wood	79.05	44.3%	10.03	7.12%
Concrete	60	33.63%	120	85.17%
Reuse	13.38	7.5%	4.6	3.26%
Total Recyclables	178.43	**48.13%**	140.9	**82.17%**
Total Trash	193.33	51.87%	30.58	17.83%
Total	370.76	100%	171.48	100%

Est. cost of project without recycling	$4,955.58
Cost with recycling	$4,039.60
Savings	**$ 915.98**

The Nagawaukee Park project in 2007 recycled two metal Quonset huts.

- The metal was sold to a scrap dealer.
- Concrete & asphalt were reused.
- Cardboard was recycled.
- Total of **472 tons** or **99.71%** of materials were kept from landfill.
- Savings = **$5,484**

Muskego Park Office Building

Sustainable/Green initiatives include:

- Building: Solar Tubes (day lighting), Concrete floors and tank-less water heaters (reduce energy & water use)
- Site Location: Erosion control and reduced site disturbance
- Construction Waste Management: Recycling C&D
- Stormwater Management: Constructed wetlands
- Landscaping: Native plantings, reduced mowing and water conserving landscaping

Grounds and Site Management

- Naturalized areas
- Reduced mowing

Naturalized Areas

Start with an aerial photo…

Parking Lot Islands

Entrances

Shelters

Shelters

Multi-Use Areas

Golf Courses

Non-Play Areas

Native Grass

Buffer Zones

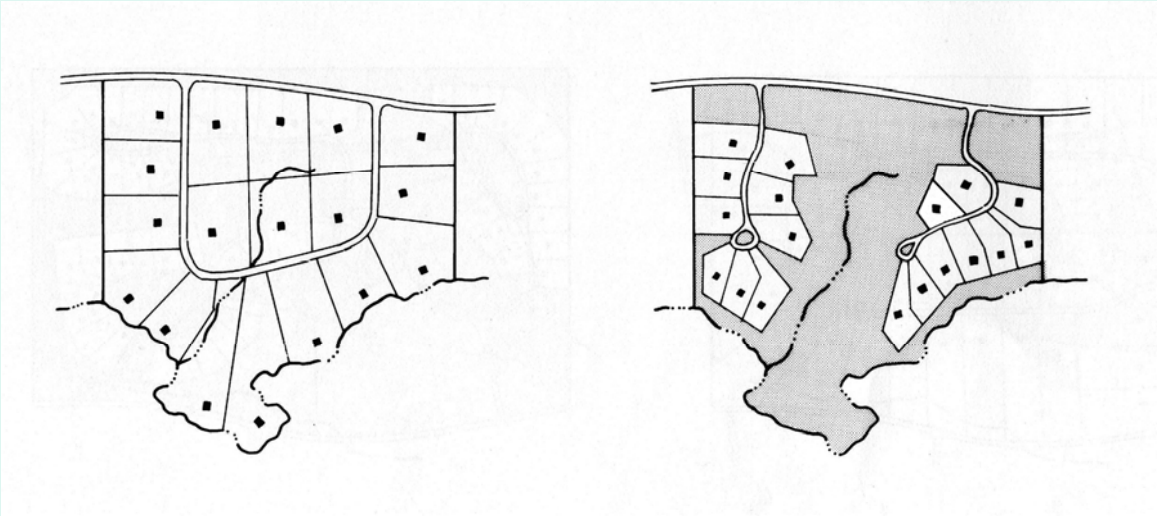
Reduced Mowing

1,500 gallons of fuel were saved last year at Minooka Park alone.

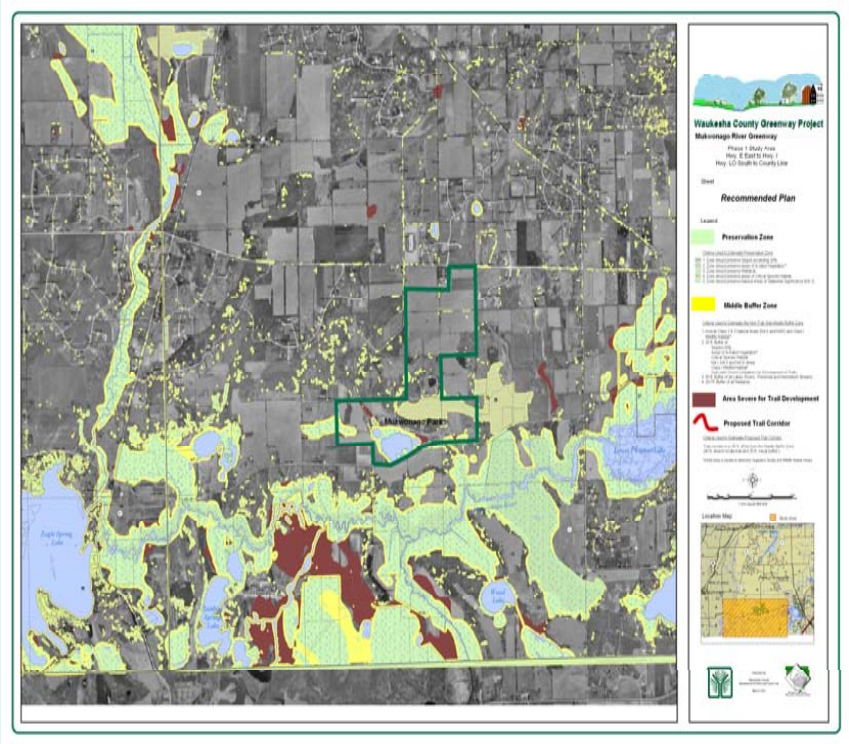
Land Use and Environment

Land Use Techniques

- Conservation and Compact Development Design – preserve open space and reduced road construction



Land Use Techniques



- Greenway Preservation along major Rivers – for water quality and natural area protection and recreational corridors

Land Use Techniques

- Storm water Management – for water quality protection and groundwater recharge

Purchasing and Employees

Environmentally Preferable Products (EPPs) are products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose.

What makes a product “Green”?

- Recycled content
- Less toxic
- Water conserving
- Energy conserving
- More durable
- Biodegradable
- Less packaging

Starting Small

- We're picking projects with a high likelihood of success
  - Energy efficient office equipment and appliances
  - Janitorial cleaning products, supplies and equipment
  - Office furniture and supplies
  - Paper
- Establishing baselines
  - How much are we buying?
  - What are the opportunities?
  - Copy others!

Communication is Key

- Use existing resources
- Involve stakeholders
- Get management buy-in
- Set goals and measure program performance
- Establish the connection between the purchases, environmental benefits and savings
- Report back
- Market success
- Reward supporters

Waukesha County Waste Watchers

A Sustainability Project to reduce paper use and conserve resources

Why Paper?

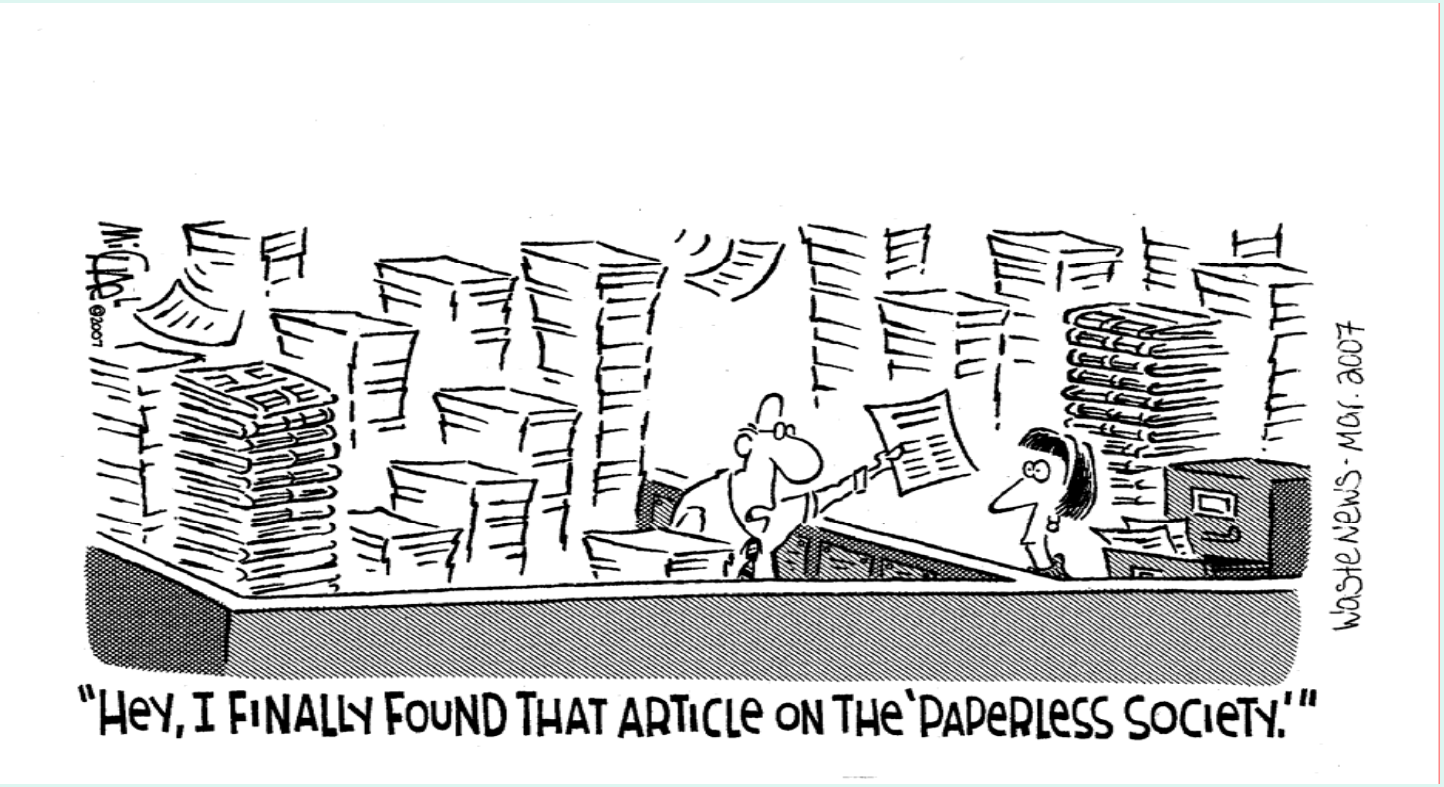
- About 42% of the wood harvested for industrial use goes to making paper.
- U.S. pulp and paper industry is the second largest consumer of energy and uses more water to produce a ton of product than any other industry.
- An average office worker uses about 10,000 sheets of copier paper per year!

Goals

- Reduce paper use by 20% compared to baseline year
- Reuse “2nd Chance” paper for in-house documents
- Educate employees to use email, duplex copy, print preview, store documents electronically
- Track and report results

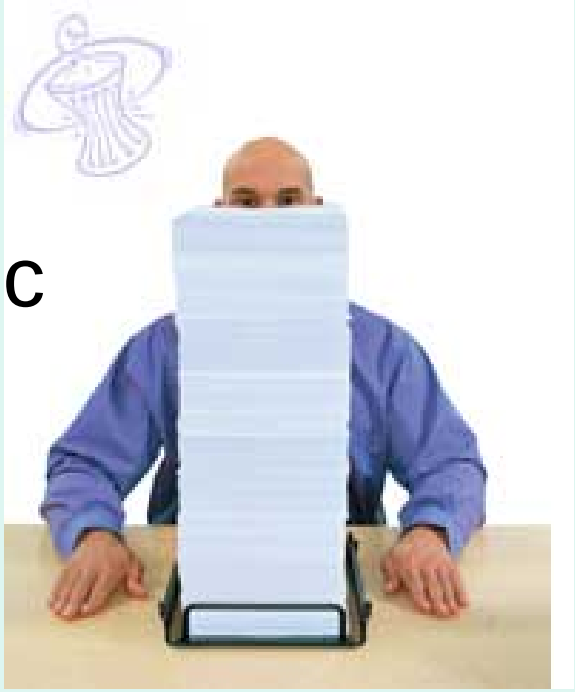
Why Now?

- New County Sustainability Plan
- More awareness of global environmental impacts
- Each of us can make a difference



Benefits

- More efficient- saves time
- Saves postage
- Easy to use shared electronic file folders
- Generate new ideas
- Reduce waste and increase recycling



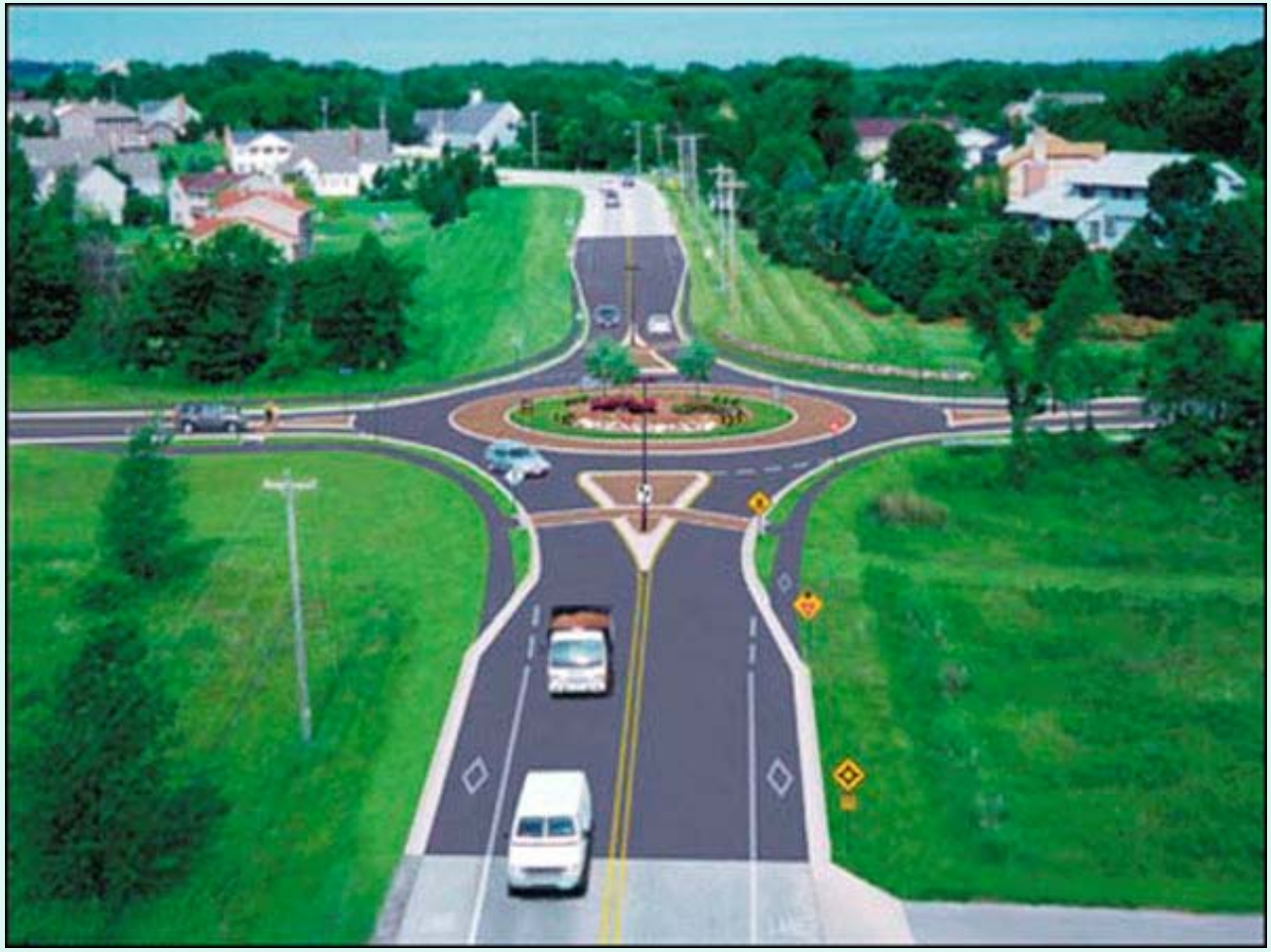
We are all part of the team

- Help co-workers solve problems
- Post reminders at copiers
- Save and use “2nd Chance” paper
- Set defaults to duplex, reset margins, print less

Transportation

- Roundabouts
- Traffic Signal Systems
- Storm Water Management
- Materials Recycling
- Walk-able and Bike-able Communities
- Salt Usage
- Fleet
- Alternate Fuels

Roundabouts



Traffic Signal Interconnect

Storm Water Management

Materials Recycling

Re-paving Techniques

- Base patch and overlay
- Crush and relay
- Foam injection and overlay
- Fly ash stabilization and overlay
- Warm mix asphalt
- Hot in place recycling

Asphalt Reclamation

Foam Injection

Walk-able/Bike-able Communities

Sidewalks

Reduce Salt Usage

- Pre-wet systems
- Use of brine
- Sand/salt mixtures
- Calcium magnesium acetate
- Calcium chloride
- Reduce spreader settings

Salt Brine Prep and Storage

Central Fleet

- Reduce hazardous waste generation
- Convert to aqueous rather than solvent-based cleaning solutions
- Review National Repair Facility Best Practices and adopt applicable standards
- Annual training
- Chemical product list

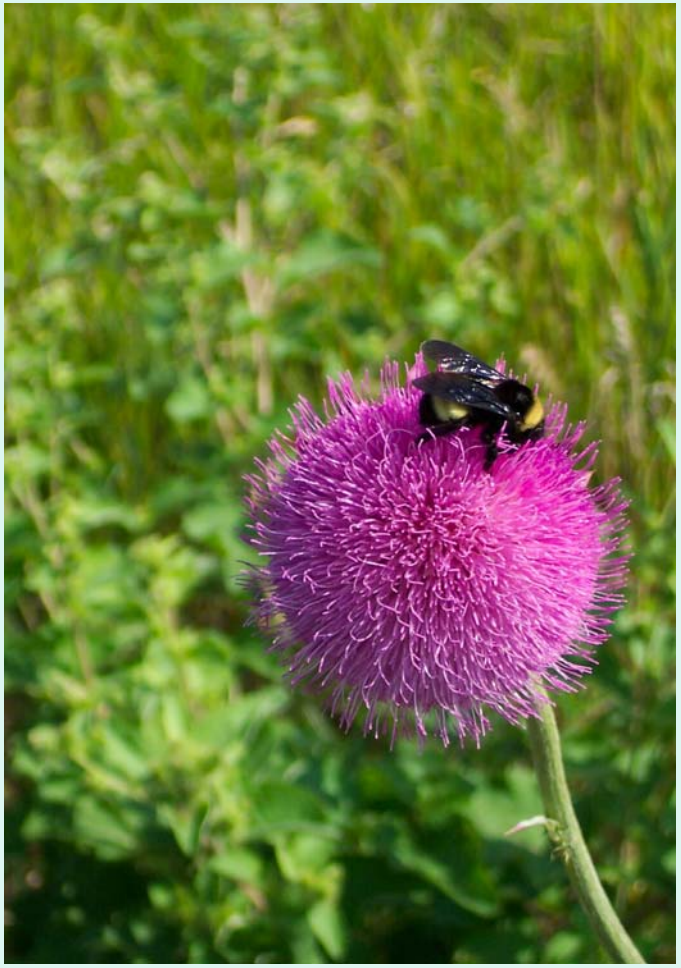
Alternative Fuels

- Study the potential use of alternate fuels and adopt where appropriate
- Study available fuels
- Investigate cost and availability of bio-fuels
- Study ROI and implement if appropriate

Other Resources

- Website: www.waukeshacounty.gov/sustain

Meeting the needs of the present without compromising the ability of future generations to meet theirs.



Year 2009 Projects

- Feasibility Study for Alternative Energy Use at Ice Arenas
- Retzer Maintenance Building Design using geothermal and solar
- Naturalizing Medians Pilot Project
- Employee / Purchasing Group
- Numerous County facility upgrades for energy and water use reduction