

CIVIL ENGINEERING LECTURE SERIES

**University of Memphis
Herff College of Engineering**

It's Not Easy Being Green

Phillip W. Lynn, P.E.
Town of Collierville

November 17th, 2010

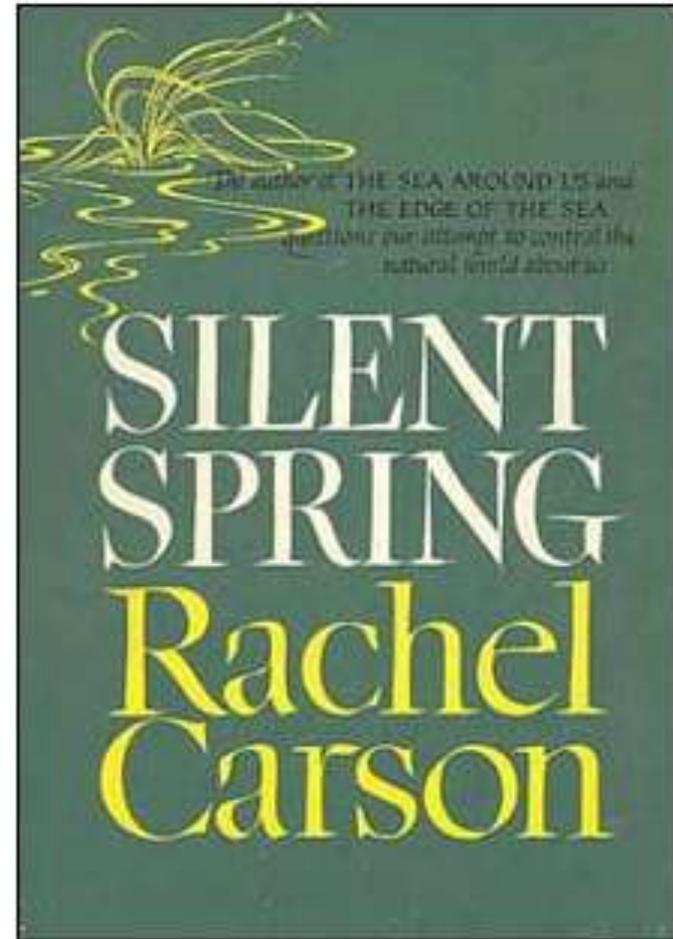
AN OVERVIEW OF 100 YEARS
(OR THEREABOUTS)
OF ENVIRONMENTAL
CONCERNS AND PRACTICES IN
AMERICA

OR

it's n●t easy
being
green



The world famous bestseller about the man-made pollutants that threaten to destroy life on this earth



September 1962

WHAT IS

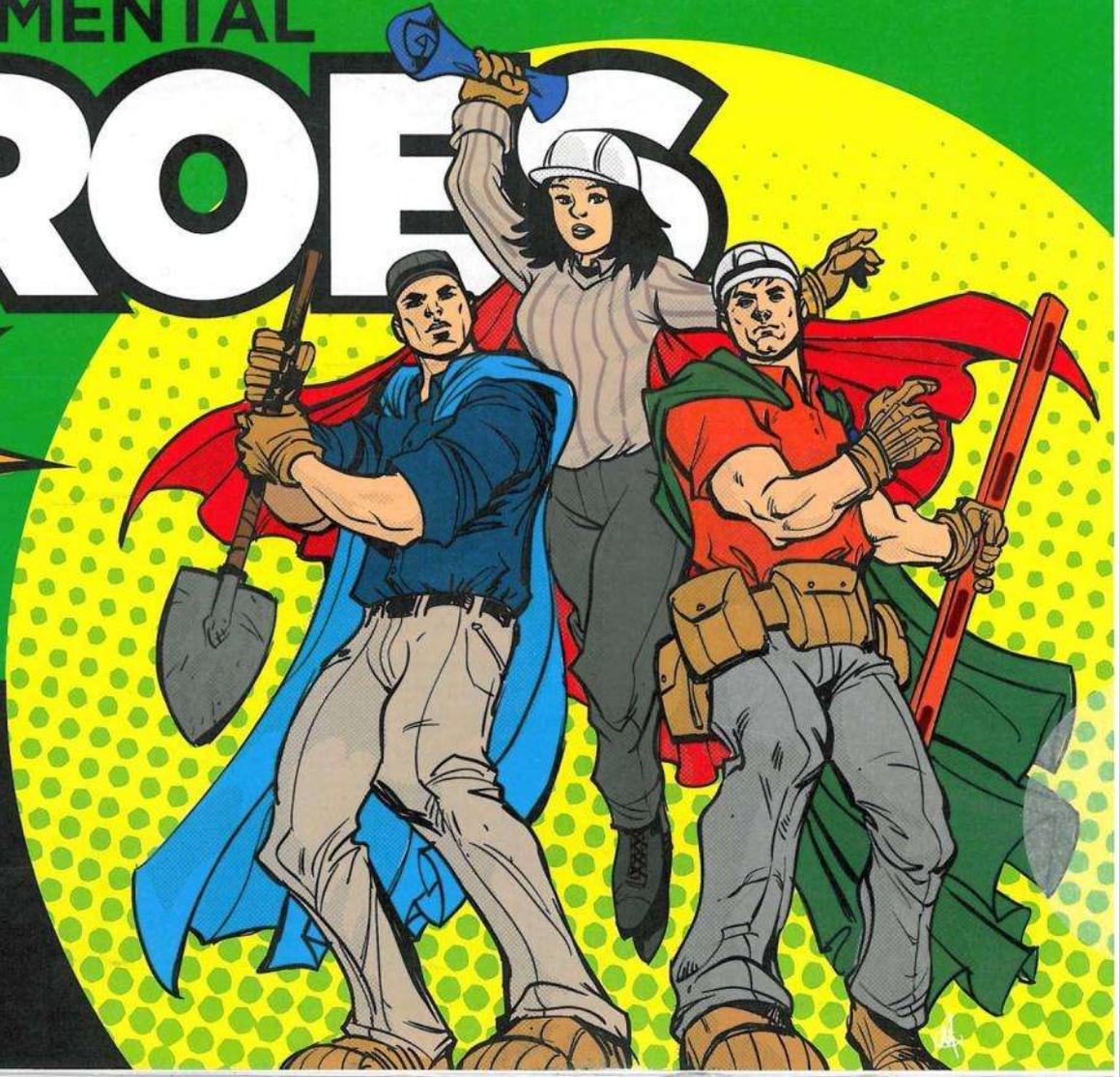
GREEN?

- 
- GREEN means different things to different people...
 - It means non-petroleum energy sources....
 - It means alternate vehicle fuels.....
 - It means elimination of air and water pollution
 - It means restoration of the environment...
 - It means sustainability.... (which is a whole new topic)....
 - It means electric vehicles...
 - It means recycling of solid wastes.....
 - It means recycling of wastewater.....
 - It means energy efficient buildings.....
 - It means elimination of sprawl....
 - It means environmental justice..... (whatever that is)....
 - It means “complete streets”
 - It means “Green Roads”
 - It means “Green Roofs” ...
 - It means “low Impact Development” (LID)....
 - It means high-speed rail development....
 - It means learning a whole new jargon.... (what is a “carbon footprint”?)
 - It means government intervention..... (can we say tax credits?)

ECO-FREAKS



ENVIRONMENTAL HEROES



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International Erosion Control Association

A

LITTLE

HISTORY

April
19,
1899
New
York
Times

CHICAGO, April 18.—The Chicago River, about which so many jests have been made, distinguished itself late last night by catching fire. The greasy water floating into it from the Kinzie Street sewer, near the bridge of that street, was set ablaze by a lighted cigar dropped from a passing car, and in a moment a sheet of flame arose from the surface of the water.

The flames spread to the docks and bridge, and also to the Northwestern Railway bridge, a few feet away. The fire boats and land engines were called, but before the flames were quenched both bridges were damaged to the extent of \$5,000. Engineer Ritter said there had been several fires on the river, and he believed they were caused by oil emptied into the sewers by gashouse employes.

The Kinzie Street bridge was wrecked, and will have to be replaced with a new one.

Ohio Makes Special Appeal to Rail Administration

Asks Rebate on the Advance in Freight Rate for Road Contracts Let Prior to the Order

A hearing was given by the railroad administration to a delegation of Ohio officials and others, who made a special appeal that rebate be made on the advanced freight rate established by General Order No. 28, where such order affects road contracts executed prior to its issuance. The hearing was before M. B. Clagett of the administration, and data were presented by the Ohio officials, showing the hardship placed upon contractors by the order.

It was pointed out that the present laws in Ohio make it impossible for the state, counties or cities to assume any portion of the extra burden placed upon contractors by the advance in the freight rate, and that this would mean a gross loss of from \$600,000 to \$700,000 to the Ohio contractors. It was also stated that if this additional expense were placed upon them the contractors, already burdened by the excess cost of labor and materials, would be unable to continue with their work and would throw up their contracts, leaving road work in a chaotic condition.

The distinction between private and public contracts in Ohio was emphasized, and Mr. Clagett's attention was drawn to the fact that the method of letting and the form of contract are prescribed minutely by law and can only be altered by an act of the legislature.

As this is an uncertainty, it was the assertion of many of those appearing that a great many of the contractors would be compelled to refuse to go on with the work. It was also questioned whether the bonding companies could be held liable for the excess cost, and if the work had to be taken over by the state whether it would not cost from \$2,000,000 to \$3,000,000 more than the contract prices, to finish it.

At the completion of the hearing, Mr. Clagett advised the delegation that he would give careful consideration to their appeal and lay it before the Director General of Railroads. The following officials from Ohio were present: Joseph McGee, attorney general; Frank Davis, special counsel under the attorney general; Victor Donahey, state auditor; W. A. Stinchcomb, county surveyor of Cuyahoga County; W. A. Alsdorf, secretary Ohio Good Roads Federation; E. S. Humphreys of the State Highway Board; G. A. McCormick, of the Contractors' Association; Frederick Bramley, president of the Cleveland-Trinidad Paving Company.

196

Nitrate Plant Near Cincinnati

The \$50,000,000 Government nitrate plant for the Cincinnati district will be erected at Broadwell, Ohio, on the Little Miami River, about 8 miles by air line and 11 miles by railroad from the center of Cincinnati. This plant was originally intended to be at Elizabethtown, Ohio, but the site has been changed, according to reports, because too much of the prospective trackage would be below maximum high water.

Emergency Fleet Corporation Has Requirement Section

Charles M. Schwab, director general of the Emergency Fleet Corporation, has created a new department called the Requirement Section, to which he has appointed as head George M. Brill, well known as a Chicago consulting mechanical engineer. In making announcement of the appointment, Mr. Schwab said: "It will be the purpose of this section to keep in touch with the shipyards and learn from them in a general way the amount of materials, supplies and equipment required for extension so that a proper schedule may be placed before the War Industries Board for survey and if necessary for allocation. I think you will appreciate that at this time, when the demand for many materials is so far in excess of the supply, it is most essential that a clearing house be provided so that the needs of different Government agencies may not conflict. The War Industries Board constitutes such a clearing house, and it is in my opinion a very essential instrument in the conduct of industry under present conditions."

Mr. Brill's main activity for the present will be directed toward the supply of steel to the various shipyards, many of which are not running at full capacity for lack of raw materials.

Opening New Sewage-Works at Albany Postponed

Owing to war conditions, the Board of Estimate and Apportionment of Albany, N. Y., has decided not to take steps to put into operation its new sewage-works, now almost completed. Difficulty has been experienced in maintaining a small number of men engaged on cleaning up the plant, writes Frank R. Lanagan, city engineer, thus suggesting still more difficulty in keeping up a full operating force. The possibility of a shortage of coal to operate the plant was also taken into consideration. It is believed that no harm will result if the sewage of Albany is discharged into the Hudson untreated for a while longer.

All-American Canal for Imperial Valley

Engineers Appointed to Make Studies for Proposed Route Render Preliminary Report

A progress report based on surveys of the route of the proposed All-American Canal for supplying Imperial Valley, California, has just been filed by the committee of engineers appointed to make preliminary studies of the project. Funds for this investigation were appropriated jointly by the Imperial Irrigation District and the United States Department of the Interior, \$30,000 by the former and \$15,000 by the latter. The board of engineers in charge of the work consists of C. E. Grunsky, appointed by the irrigation district; Dr. Elwood Mead, appointed by the University of California, and W. W. Schlecht, appointed by the Secretary of the Interior. The plan is to compile data concerning a canal which would have the advantages of being for its entire length on American territory and would increase the area that could be irrigated without pumping. Incidentally, such a canal would afford opportunity for considerable power development. A review of the main features of the committee's report follows:

The All-American Canal should be constructed, the report recommends, on the basis of irrigating 900,000 acres. It would be designed to carry 10,600 sec.-ft. from the Laguna Dam to Siphon Drop and below the Siphon Drop 9000 sec.-ft. The canal would be about 15.5 ft. deep, nowhere exceeding 16 ft., the side slopes 1½:1. The velocity is to be 3.5 ft. per second when the canal is full and 2.5 ft. per second when half full. A velocity of 6 ft. per second is to be maintained in the concrete-lined sections and a velocity of 10 ft. per second in tunnel sections. All tunnels of considerable length will be constructed in duplicate some distance apart.

Until the main canal can be constructed around Pilot Knob, delivery would be made to the present canal below Hanlon Heading. Laguna Dam at the head of the canal would be raised from 1 to 2 ft. above its present crest, and the new canal intake would be provided with headgates of the flash-board type for a total length of 1200 to 1600 ft. The present desilting works at Laguna Dam will require enlargement and in addition the detention of silt would be provided for in two stretches of the canal, one occupying a mile of its length near the Laguna Dam and the other occupying a two-mile stretch near Hanlon Heading. Large sluice waste gates would be

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Engineering News-
Record
July 25, 1918

WHAT???

education, however, must come before there can be any real progress.

Split into dozens of sectional organizations, contractors will be at a hopeless disadvantage in the wholesale bargaining for new working conditions which must follow the war. Neither can contractors hope, without a national labor policy, carried out in every section of the country through a national organization, to avoid serious losses incident to the readjustment that will be forced in the money measure of wages. It will be all very well, after prices have fallen and there is no Government work to pay high labor costs, to tell a union official that his men can live better on \$4 a day than was possible during the war on \$6. It will be quite another matter to convince this same official that unless his men do live on \$4 a day there will not be any work for them, and to make him see that this will not be the fault of contractors or of any other one group of interests.

To meet this situation planning of national scope should be under way at the present moment. The best brains that the contracting industry can produce and the men most successful in dealing with organized labor should be engaged on it. National planning and the concentration of the best minds in the construction business on the labor problem can come only when there is a representative national organization of contractors. The movement on foot to form such an organization, which had its inception at Atlantic City, and which is noted in the news section of this issue, cannot reach fruition a day too soon.

Is Sewage Treatment an Essential Industry?

ALBANY'S decision not to put its new sewage-works in operation, noted last week, raises an interesting question. Is sewage-treatment an essential industry? A well considered answer to the question must be based on the law of relative values and on the local conditions affecting each sewage-works. Such an answer must take into account the need of the nation and its allies for money, material and men to win the war; how the individual city can best utilize its curtailed funds, supplies and man power; and, last but not least, how much actual rather than theoretical good the operation of the works will do.

It might not be well to raise what at first thought may seem so reactionary a question were it not for a belief, based on observation extending over practically the entire history of sewage-treatment in America, that a large percentage of our sewage-works have been built under false assumptions of what can reasonably be accomplished, and that the country is dotted over with plants which are so inefficiently run as scarcely to justify the expense of operating them even in peace times. In the present emergency, all sewage-works should be given a searching examination with a view to shutting them down where they are not helping win the war or seeing that, if really essential, they are made efficient. The scrutiny should be all the closer in the case of plants which require coal or other fuel for their operation and which are located in parts of the country subject to coal shortage, as is the case at Albany. The difficulty of getting and keeping trained operators, and the certain inefficiency of many if not most sewage-works with-

out them, is another factor to be considered in deciding whether the operation of sewage-works in these war times is justifiable.

A few words may be said for the benefit of those who have not followed sewage-treatment closely or who for any other reason are not correctly informed as to its aims and possibilities. The real function of most sewage-works is to prevent nuisance. Of those fittingly designed to protect the public health in any marked degree very few indeed are so operated as to insure the attainment of that end.

This is a time to clear up false notions. Let us ascertain just what each sewage-works of the country should be called on to do from the viewpoint of relative values; shut down those works which are not needed and take vigorous steps through local, state and if need be Federal action to see that those plants having a vital service to perform do not continue to shirk their duty to their community and the world.

State Bars Against City Improvements

WHEN the qualified voters of a city declare 8444 to 128 in favor of a bond issue for municipal improvements, as was done at Atlanta recently, any one not familiar with the vagaries of state legislative restrictions on municipal activities would naturally suppose that the city concerned could go ahead with the desired work. Not so in Georgia. State legislation there requires that bond issues must be approved by two-thirds of the registered voters at the time of the election. Therefore, although the vote was 66 to 1 in favor of the proposed \$800,000 bond issue at Atlanta, the improvements are held up because 784 more votes were required to meet a high and arbitrary statutory requirement. Of the proposed bonds \$500,000 were very badly needed to carry out improvements to the water-works, some of which should have been made years ago and which are now doubly needed to meet city and cantonment conditions incident to the war. The emergency is so great that Mayor Candler has generously offered to underwrite \$250,000 pump contracts in order that citizens and soldiers may not be threatened with water famine. Atlanta's sister city, Macon, profiting from Atlanta's experience, rallied a small margin of votes for a \$200,000 bond issue by dint of hard work.

Throughout Ohio for several years past all municipalities, large and small, have been at their wit's ends to meet operating expenses owing to rigid taxation and restrictions. New Orleans is even worse off than the Georgia and Ohio cities. It has to secure amendments to the State constitution before it can embark upon quite ordinary municipal enterprises, such as a garbage reduction plant.

The time has come to sweep away many of these absurd State restrictions on city activities. This does not mean that no limit should be put on the taxing and bonding powers of cities, but that the limits should be reasonable. As a rule, too, State constitutions should be kept free from municipal bond and tax restrictions; and the state legislatures should attempt to lay down only broad limits or principles, leaving details to be handled by some central administrative body, whose decisions would be made after expert investigation.

1918.

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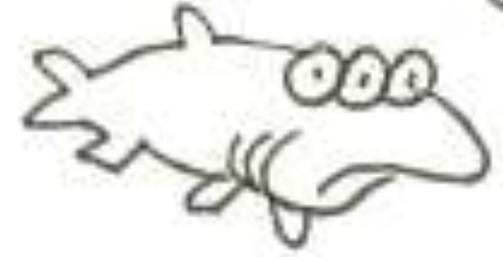
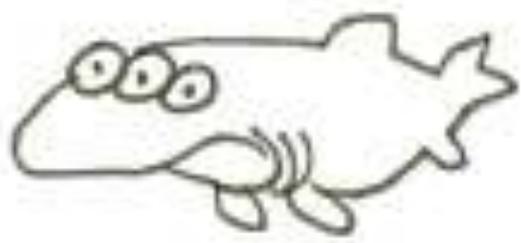
Engineering News-Record
August 1, 1918

WOW!!

- Snail darter



THE NUCLEAR POWER PLANT DIDN'T DOOM
THE SNAIL DARTER AS FEARED.

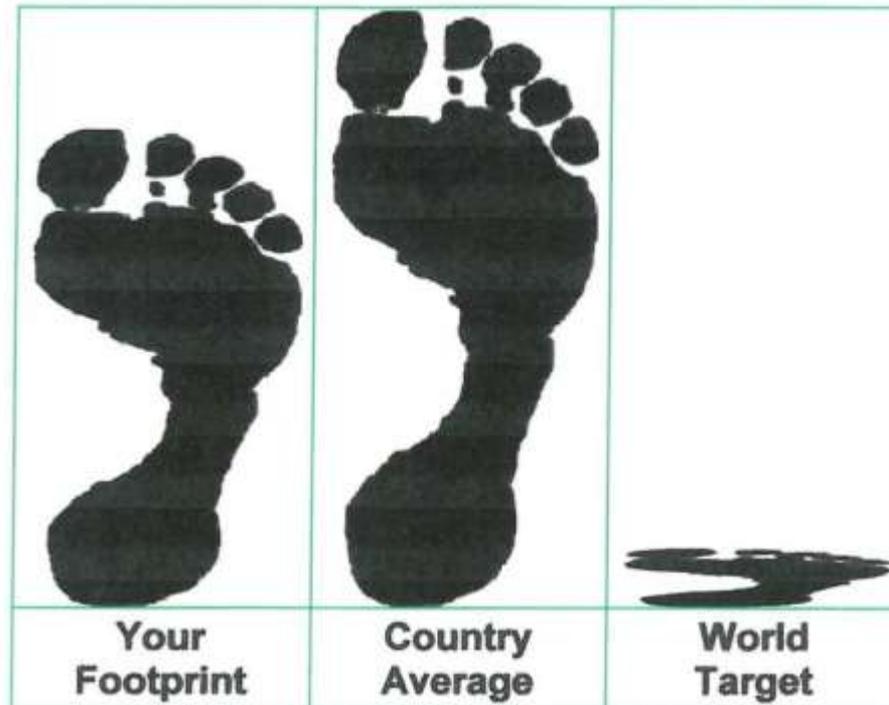


core jet

Carbon footprint?



<http://www.carbonfootprint.com/calculator.aspx>



Your Carbon Footprint:

- ✓ House 0.60 metric tons of CO₂
- ✓ Flights 0.37 metric tons of CO₂
- ✓ Car 7.32 metric tons of CO₂
- ✓ Motorbike 0.00 metric tons of CO₂
- ✓ Bus & Rail 0.00 metric tons of CO₂
- ✓ Secondary 8.04 metric tons of CO₂

Total = 16.33 metric tons of CO₂

Total To Offset = 16.33 metric tons of CO₂



- Your footprint is 16.33 metric tons per year
- The average footprint for people in United States is 20.40 metric tons
- The average for the industrial nations is about 11 metric tons
- The average worldwide carbon footprint is about 4 metric tons
- The worldwide target to combat climate change is 2 metric tons





"Somehow, it's not the same as when we were here on our honeymoon."

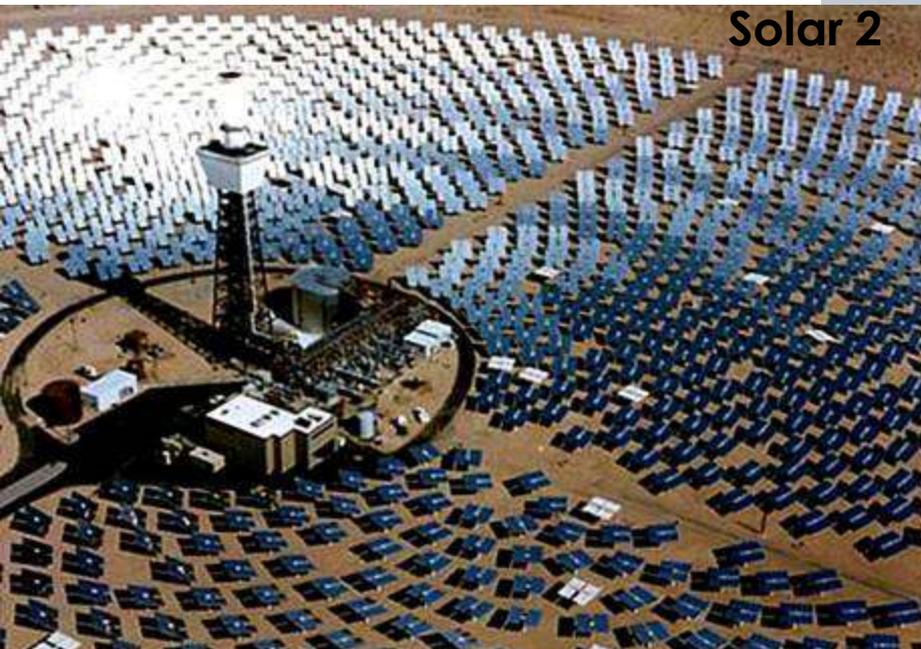
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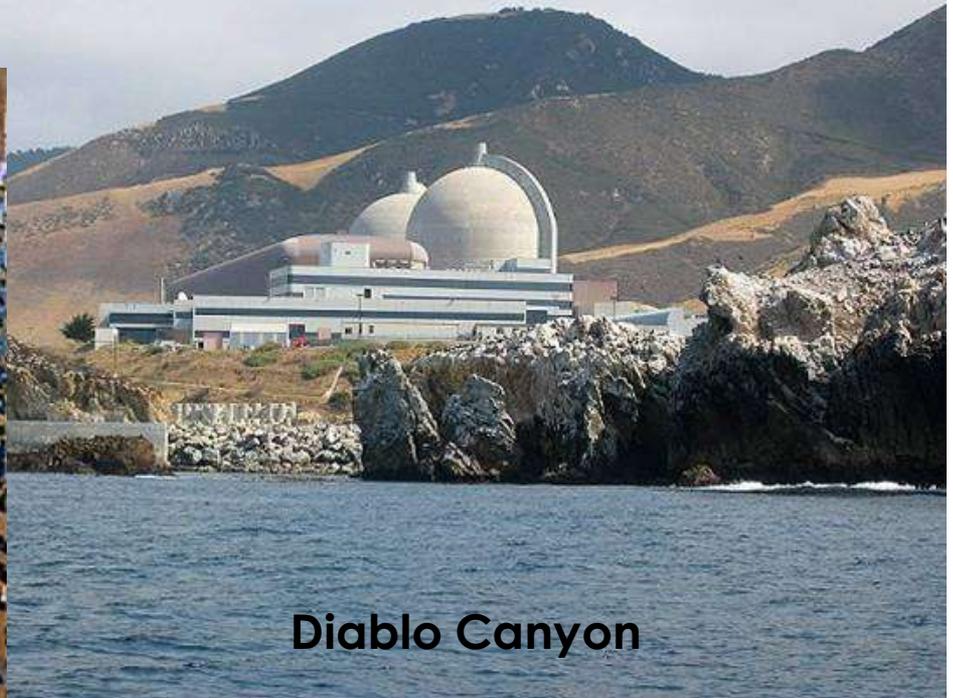
search ID: dbrn519

ALTERNATIVE FUEL

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Solar 2



Diablo Canyon



"I know you like your Corn Twisters cereal, Derek, but Daddy needs them for his gas tank."

GREENER ROADS AHEAD

The Oregon Department of Transportation is using the Greenroads system on four pilot projects within the state, including a project that seeks to widen U.S. Route 97 south of Bend from two lanes to four. Creating dedicated wildlife crossings and recycling roadway materials are among the sustainable options being considered.









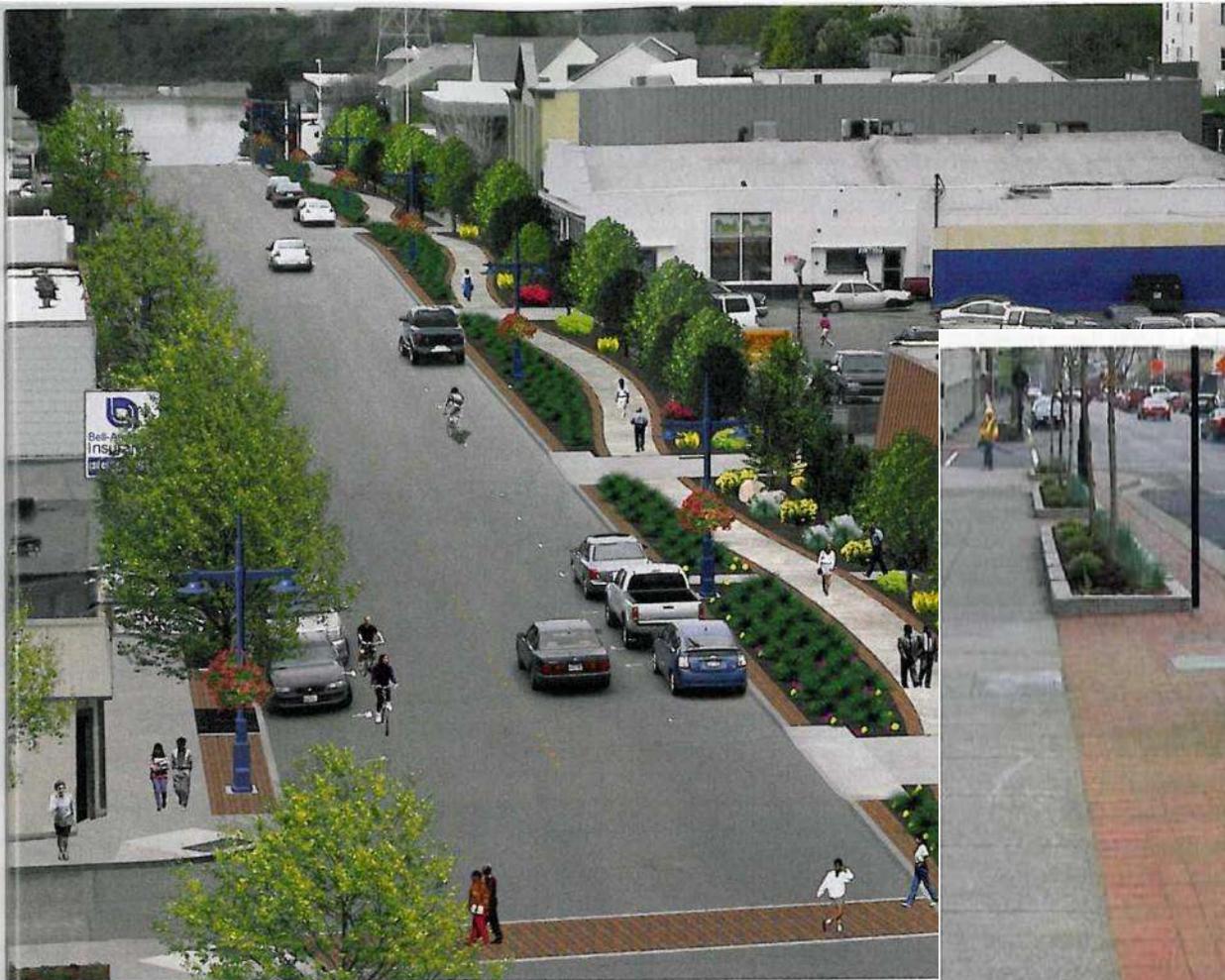
One of the most striking features of the Transbay Transit Center is a 5.4-acre rooftop park. The public space will include grassy areas, trees, indigenous plants, water fountains, and an amphitheater.



San Francisco TransBay Transit Center

<http://transbaycenter.org/>





In addition to runoff treatment systems conforming to the principles of low-impact development, "green streets" with special intersection and sidewalk treatments to improve access for pedestrians and bicyclists are being constructed.



Bremerton, Wa Streetscape

As the City of Bremerton reconstructs Pacific Avenue, its main downtown commercial and residential street, it is including porous pavements along with curb "bulb-outs" and street "neck-downs" to facilitate the infiltration of storm water.

Landscape Your Hardscape.



THE ECO-FRIENDLY ALTERNATIVE TO TRADITIONAL SURFACE SOLUTIONS

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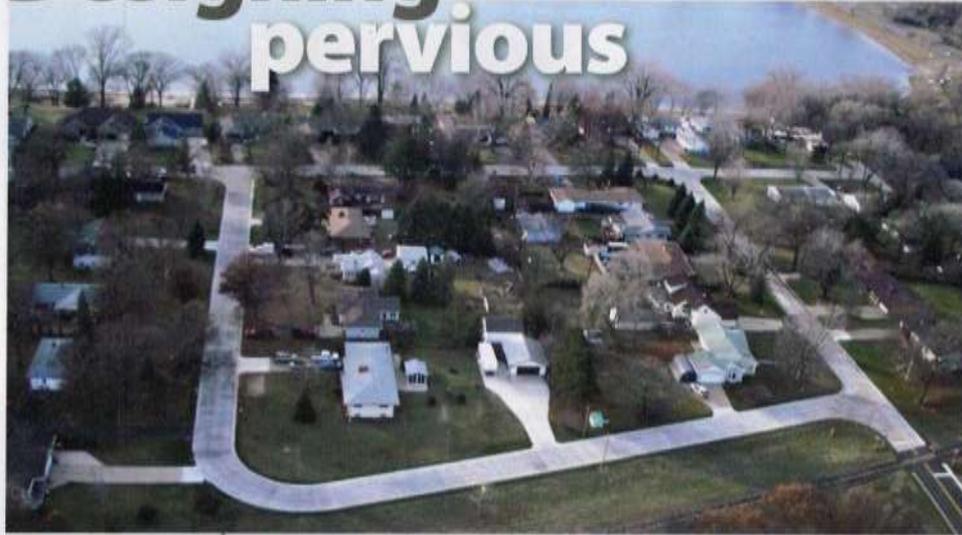
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Designing pervious



A Minnesota city eschews storm drains for pervious streets.

For the past couple of years, several concrete associations have marketed pervious concrete as a sustainable product with many benefits. Although used in the Southeast since the 1980s, it is considered a new innovation in other parts of the nation.

As is the case with products tried for the first time, there have been problems and job failures. Pervious concrete is very different than other types of concrete because of its mix design, placement procedures, and curing requirements, and slab replacements can result when best practices aren't followed.

In 2009 a residential street project in Shoreview, Minn. — a suburban area north of St. Paul — received national attention because it was the largest public street project in the country to use pervious concrete in lieu of storm sewers. The city installed about 1 mile of the porous pavement that will allow water to drain

straight to the ground below and prevent runoff that can be damaging to waterways. There were no catch basins, pipes, or settling ponds. But this project also deserves a closer look because of the thoughtful and innovative forensic research conducted by the parties involved before the job even began.

(continued)

Project: Shoreville, Minn., street reconstruction

Pervious concrete cost: \$86.30/square yard for a total of \$731,000 (including 8,470 square yards of concrete placed, excavation, rock for the drainage layer, and fabric)

Total cost: \$1,231,000 (includes reconstruction of the road, extension of water and sewer service, and restoration)

Project delivery method: Design-bid-build

The large, white square stretch of pervious concrete pavement alongside Lake Owasso in Shoreview, Minn., was installed in 2009. At 79,800 square feet and 7 inches thick, it's the largest pervious public street in the nation. Photo: William Randle

Shoreville, MN



'Nonpoint' sources are responsible for three-quarters of California's most polluted waters. Unable to recoup remediation costs from developers or taxpayers, stormwater managers in the state that laid the groundwork for the Clean Water Act test the law's bottom line: Who pays?

Rain dance

The San Elijo Lagoon Nature Center is located at the terminus of one of the dozens of watersheds across San Diego County that are threatened by nonpoint source pollution from urban development.

Photo: P7 Photography

Cost of Green Power Makes Projects Tougher Sell

New York Times (11/08/10)

Michael Polsky's company Invenergy was doing well in 2008, and banks provided millions for him to provide clean energy. But now Polsky is having difficulty keeping contracts. The company had plans to sell power to a utility in Virginia, but state regulators rejected the agreement because of the recession and low natural gas prices. **Even though many people want the projects to go through, a growing number are being canceled due to the fact that the government does not want consumer bills to go up.** By the end of the third quarter, year-to-date installations of new wind power fell 72 percent from 2009, according to the American Wind Energy Association.

http://www.nytimes.com/2010/11/08/science/earth/08fossil.html?ref=beyond_fossil_fuels

- “One of the problems in the United States is that we haven’t been willing to confront the tough questions,” said Paul Gipe, who sits on the steering committee of the Alliance for Renewable Energy, a group advocating energy policy reform.
- “We have to ask ourselves, ‘Do we really want renewables?’ ” he said. “And if the answer to that is yes, then we’re going to have to pay for them.”

ASCE Puts You On the Green Line

Sustainable civil infrastructure provides **environmental, economic, and social** well-being, now and for the future... That's ASCE's **Triple Bottom Line**.

ASCE is already implementing sustainability programs to help you and your company build a socially responsible and sustainable world:

- ASCE has published dozens of books and references that contain specific guidance on putting sustainable techniques into practice, covering most disciplines and specialties
- ASCE founded Practice, Education and Research for Sustainable Infrastructure (PERSI) to advance and incorporate concepts and knowledge of sustainability into the standards and practices used throughout the life cycle of infrastructure systems
- ASCE offers Sustainability Guidelines for Sections and Branches to bring sustainable practices to the local level

Beyond these resources, ASCE is developing a host of resources to launch in the coming year to help civil engineers plan and execute with sustainability in mind.

Here's how:

- Unveiling a Sustainability Certificate Course — [Fundamentals of Sustainable Engineering](#)
- Debuting the [Professional Certification in Sustainable Engineering](#) program
- Establishing an [ASCE/ANSI Standard for Sustainable Infrastructure](#)
- Advancing [sustainability in public policy](#) with government and non-governmental organizations
- Delivering [Leadership in Energy and Environmental Design – Existing Building \(LEED-EB\) Certification of ASCE Headquarters](#)
- Establishing, with others, a viable [sustainable infrastructure rating tool](#) valued by owners and the industry

Use these resources and follow new ASCE sustainability initiatives by visiting www.asce.org/sustainability

ASCE makes it easier to be Green... With Helpful Sustainability Tips to Save the Planet and Your Wallet:

1. **Digitize** — Despite being in the digital age, we still consume enormous amounts of paper. The greenest paper, of course, is no paper at all. Keep files on computers, review documents onscreen, and invoice electronically rather than sending invoices.
2. **Use Less Water** — In most homes, the water heater is second only to the heating system in energy usage. Wash laundry in cool water, turn your water heater down to 120 degrees, and when you do dishes, don't forget to shut the faucet off while scrubbing.
3. **Lunch Time** — Bringing lunch to work in reusable containers is likely the greenest (and healthiest) way to eat at work. If you do order delivery, join coworkers in placing a large order. Also, bring in a reusable plate, utensils, and napkins.
4. **Less Packaging Saves More** — Pesky layers of packaging do more than keep you from using your purchase faster: they waste precious resources. Plus, chances are companies sparing the packaging waste are more environmentally conscious in other areas like supporting pesticide-free agriculture.
5. **Making Cool Affordable** — Program your thermostat to a few degrees higher (such as 78 degrees) when no one is home. Raising your thermostat by only two degrees and using your ceiling fan can lower cooling costs by up to 14 percent.
6. **Find a Recycled Paper Supplier** — Choose one with maximum available recycled content.
7. **Drive Less** — If you reduce your mileage by 20 miles a week, you will keep up to 1,000 lbs of CO₂ out of the air annually. A daily car commute of 20 miles round trip can add up to more than \$2,000 per year, parking not included. Ask your HR department about any carpooling discounts and free or deeply discounted bus, train, or subway passes. Replacing even one or two car trips a week will trim your fuel bill (and probably your waistline).
8. **Recycle...Even More** — Next time office supplies run down, choose stationery and other supplies made from recyclable materials that are better the second time around (like this insert). Take your used car batteries, antifreeze, and motor oil back to participating mechanics. Return plastic bags to the grocery store. Give old cell phones and cars to your favorite charity.
9. **Make Bottled Water a Thing of the Past** — Get a reusable container to carry water, and install a filter to make your home tap taste more like bottled water.
10. **Buy Locally** — The fruit you topped your cereal with this morning could have traveled more than 1,500 miles. Buying local not only supports local farmers but also reduces the CO₂ emissions from food transport.

* Tips gathered from Yahoo! Green, Top Ten Ways to be Green, About.com, 10 Ways to Make Your Business Environmentally Friendly, and Planet Green, How to Go Green at Work.

Printed on Recycled Paper.

Get in the Green

Phil Lynn

From: APWA [rshilaneK@apwa.net]
Sent: Thursday, September 08, 2010 6:30 PM
To: Phillip Lynn
Subject: Electric Vehicles and Plug-In Networks: Are You Ready? Coming September 23, 2010



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[Event Details](#)

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[Education Calendar](#)

September 23, 2010 Electric Vehicles and Plug-In Networks – Are You Ready?



Date(s): September 23, 2010

Schedule: 8:00a - 10:00a Pacific 10:00a - 12:00p Central
9:00a - 11:00a Mountain 11:00a - 1:00p Eastern

Location: Audio/Web Broadcast

Cost: Members: \$175.00 per site
Non Members: \$300.00 per site

Register by: Wednesday, September 22, 2010

[Register Online!](#)

Description: Electric Vehicles and Plug-In Networks – Are You Ready?

Electric vehicles (EVs) are about to hit the market. Coordination across stakeholders could determine whether they are successful in your area. What can you do to get ready? Broaden your understanding of plug-in readiness and hear what other communities are doing to prepare their infrastructure now.

After viewing this program, participants will better be able to:

- Understand the current status and near future of the plug-in vehicle industry
- Identify the key barriers to EV success and integration with the grid
- Learn what can be done to overcome these barriers

Fax registration form:
[cl_liveorder1011updated.pdf](#)

Speakers: **Matthew Mattila**
Consultant (Transportation)
Rocky Mountain Institute
Boulder, Colorado

Ron Achelpohl, PE
Assistant Director of Transportation
Mid-America Regional Council
Kansas City, Missouri

Phil Lynn

From: APWA [jshilhanek@apwa.net]
Sent: Thursday, October 21, 2010 6:00 PM
To: Phillip Lynn
Subject: Don't Miss APWA's November 4 CLL: Gray Water Reuse and Rainwater Harvesting



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November 4, 2010 Gray Water Reuse and Rainwater Harvesting

Date(s): November 4, 2010

Schedule: 8:00a - 10:00a Pacific 10:00a - 12:00p Central
9:00a - 11:00a Mountain 11:00a - 1:00p Eastern

Location: Audio/Web Broadcast

Cost: Members: \$175.00 per site
Non Members: \$300.00 per site

Register by: Thursday, November 04, 2010

[Register Online!](#)

Description: Precious water resources are becoming scarcer and many municipalities face long-term water shortages. Sign up today for this review of two sustainable water management practices - gray water reuse and rainwater harvesting - and discover how you can realize both water conservation and potential energy savings by reducing the amount of water and wastewater that requires treatment. Hear about how gray water from sinks, showers, washing machines, and more can be used for purposes like toilet flushing and landscape irrigation at both residential and public facilities - all with minimal treatment. Discover how rainwater harvesting is being utilized to manage stormwater runoff and reduce treated water usage in two municipalities. Learn about the applications both water management strategies can offer residential and public facilities.

After viewing this program, participants will be better able to:

- Identify the applications and standards for gray water use
- Understand how successful rainwater harvesting programs are utilized in other municipalities
- Understand the impact of these water management strategies on water conservation efforts

[Fax Registration Form.pdf](#)

Speakers: **Dr. Sybil Sharvelle**
Assistant Professor
Colorado State University



APWA SUSTAINABILITY in public works conference

June 27-29, 2011
Portland, Oregon

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June 27-29, 2011

Portland, Oregon

Plan now to attend this outstanding event in America's Greenest City!

Explore the latest in sustainable strategies and the best practices to lead your agency to success!

The APWA Sustainability in Public Works Conference is designed to explore and promote the evolving role of public works professionals in the creation of sustainable communities. Sustainability is a cross-cutting concept that touches all aspects of public works. The demands for economic, social, and environmental responsibility are increasing daily. Enhance the vitality of your community by joining APWA's brightest leaders and innovators for an inside view of the sustainability revolution in public works. [\(More...\)](#)

Days until the Sustainability in Public Works conference

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BEST OF GREEN 2010

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Awards!



**AWARDING
EXCELLENCE IN
SUSTAINABILITY**

Green Solution Project of the Year.

BEFORE



AFTER



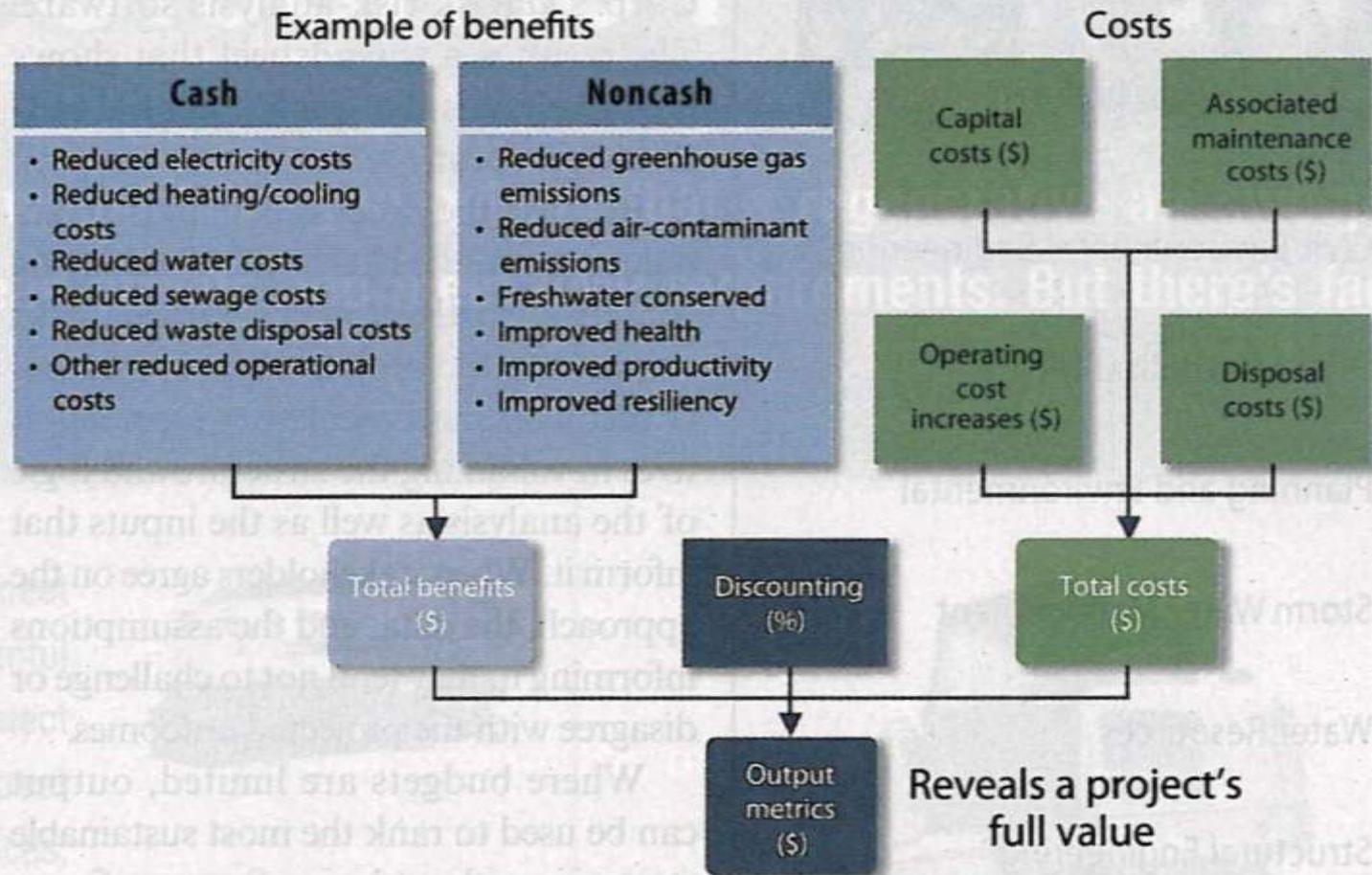
Converting 20,000 acres of impermeable public land like this former transit yard to natural stormwater control solutions could cut polluted runoff from Los Angeles County in half. Photos: City of Los Angeles

● **Administration & management** / by John Williams and Stephane Larocque

Justifying sustainable projects

*Quantifying the intangible value of green strategies
for comparison to traditional alternatives.*

SROI flow diagram



Traditional financial evaluation tools look solely at financial impacts. Sustainable return on investment *also* considers noncash benefits and costs of environmental and societal factors, such as lower emissions, that impact both the operation and the community as a whole. Source: HDR Engineering Inc.

Control measure metrics

How to calculate the potential cost and impact of best management practices.

The figures on this page represent standalone stormwater projects. But many operations are incorporating runoff-control measures into planned capital improvements like street or curb replacement, a new park, or a roof replacement.

In such cases, the "premium" for a green retrofit may be little or nothing.

Which, along with being environmentally friendly, is one of the beauties of green infrastructure.

TABLE 1/Per-unit control values

Figures based on managing 80% to 90% of annual runoff volume in well-drained soils or poorly drained soils with underdrains.

CONTROL MEASURE		Square feet of impervious surface managed	
		LOW	HIGH
Storm basin retrofit*	Each	200,000	500,000
Residential on-lot rain garden	Per sq./ft.	11	32
Green space	Per sq./ft.	33	72
Green streets	Per sq./ft.	12	36
Green parking lot	Per sq./ft.	12	36
Rain barrel*	Each	21	77
Green alley	Per sq./ft.	1	2
Rain garden-in-a-box*	Each	1,162	2,500
Green roof	Per sq./ft.	1	1

TABLE 2/Installation unit costs

Based on data from 29 suburban, urban, and green space retrofits in Indianapolis and Columbus, Ohio; the Center for Watershed Protection's *Urban Stormwater Retrofit Practices Manual v1.0*; Water Environment Research Foundation's *BMP and LID Whole Life Cost Models v2.0* report; the Center for Neighborhood Technology's *Green Values Calculator*; and RS Means *Site Work & Landscape Cost Data 2009, 28th Ed.*

Visit www.pwmag.com for direct links to these tools.

CONTROL MEASURE		LOW	HIGH
Storm basin retrofit*	Each	\$5,000	\$20,000
Residential on-lot rain garden	Per sq./ft.	\$1.60	\$5.30
Green space	Per sq./ft.	\$3.60	\$25
Green streets	Per sq./ft.	\$9	\$36.50
Green parking lot	Per sq./ft.	\$9	\$36.10
Rain barrel*	Each	\$50	\$290
Green alley	Per sq./ft.	\$1.50	\$16
Rain garden-in-a-box*	Each	\$7,500	\$34,850
Green roof	Per sq./ft.	\$5.50	\$24.10

TABLE 3/Costs per square foot of impervious surface managed

Dividing the installation cost (Table 2) by the area managed (Table 1) yields the budget manager's Holy Grail: C/I.

CONTROL MEASURE		LOW	HIGH
Storm basin retrofit*	Each	\$0.01	\$0.10
Residential on-lot rain garden	Per sq./ft.	\$0.05	\$0.50
Green space	Per sq./ft.	\$0.05	\$0.75
Green streets	Per sq./ft.	\$0.25	\$3
Green parking lot	Per sq./ft.	\$0.25	\$3
Rain barrel*	Each	\$0.65	\$14
Green alley	Per sq./ft.	\$0.75	\$16
Rain garden-in-a-box*	Each	\$3	\$30
Green roof	Per sq./ft.	\$5	\$30

* Per basin, barrel, or box

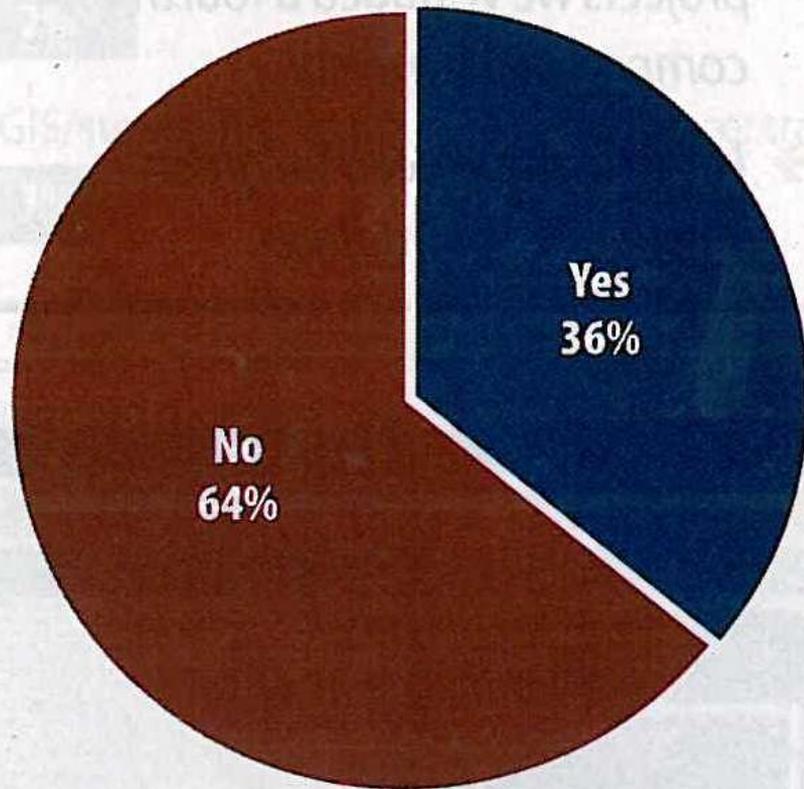
How to go

“green”

by

2013

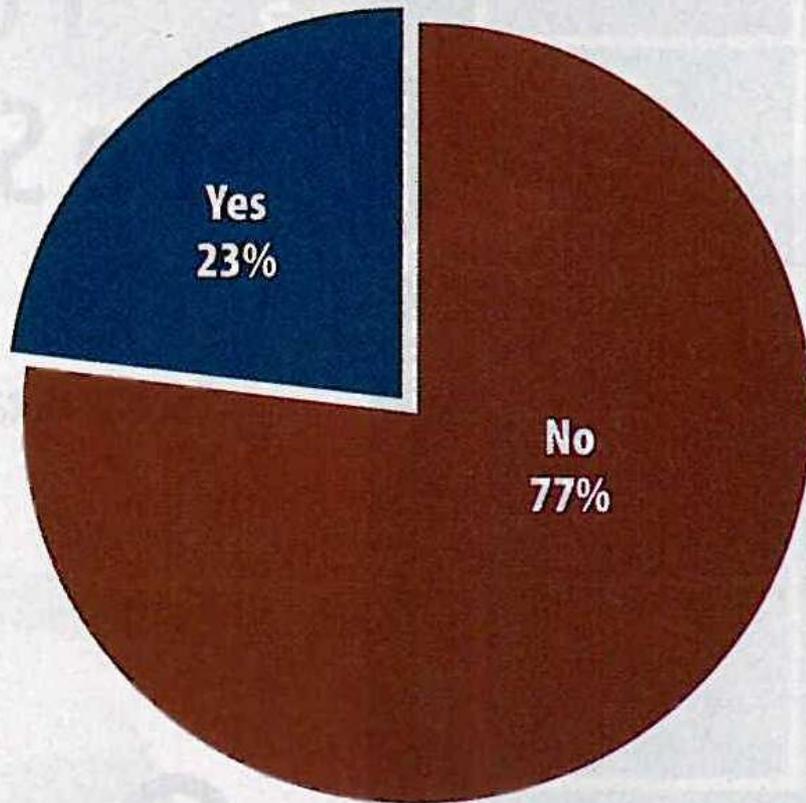
Does your operation have a formal sustainability action plan or other document designed to foster environmentally healthy projects, programs, and services?



» COMMENTS «

- *We put one into place when applying for stimulus grants for energy conservation initiatives.*
- *Our county has several, typically adopted at the township, village, or city level. Unfortunately, there are overlapping, redundant, and conflicting requirements.*

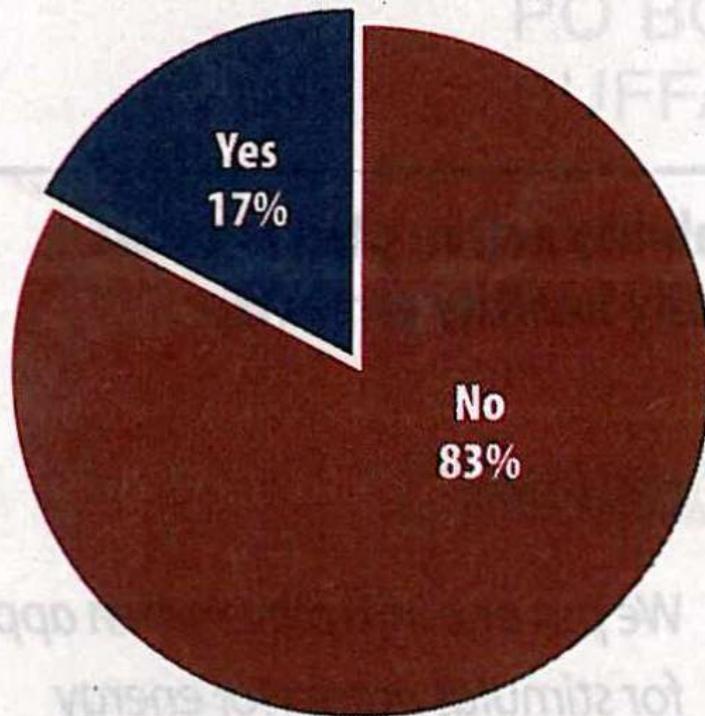
Has your operation calculated its carbon footprint?



» COMMENTS «

- *Communitywide initiative.*
- *The politicians are waiting for a state ballot measure that will give them the power to avoid such calculations.*
- *You have got to be kidding!*

Does your operation use a “green scorecard” or other system for rating a project’s environmental and/or financial sustainability?



» COMMENTS «

- *In addition to a triple bottom line analysis — financial, social, and environmental — on certain projects we’ve added a fourth component: technical.*
- *Hard to argue need for green versus price or tradition.*

CHATTANOOGA
PROJECTS



Stormwater Recycling and Beneficial Reuse

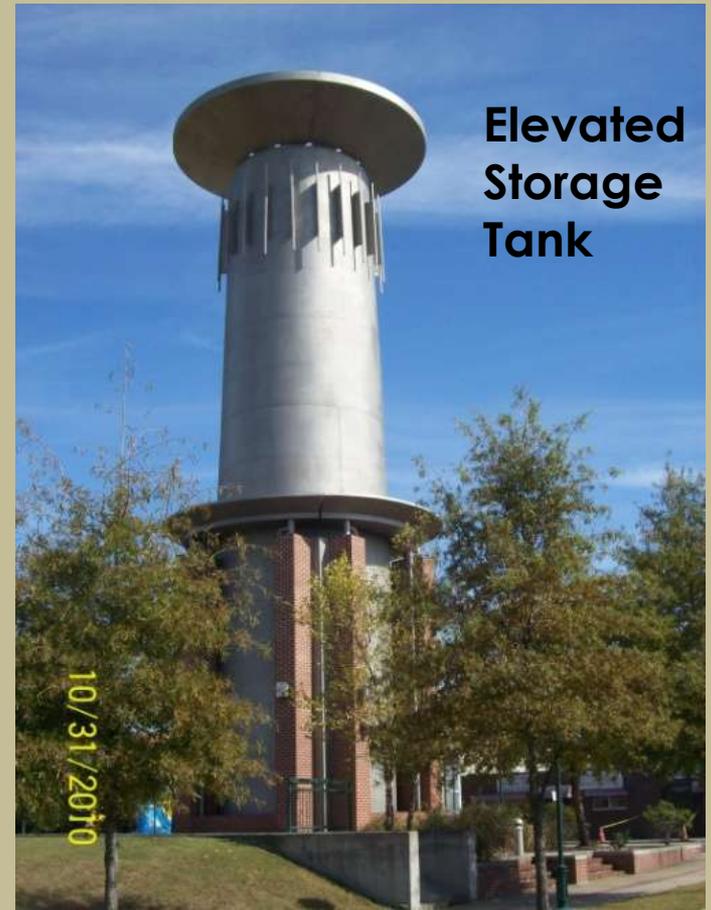
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Stormwater Recycling and Beneficial Reuse



10/31/2010

Understreet
Storage



Elevated
Storage
Tank

10/31/2010



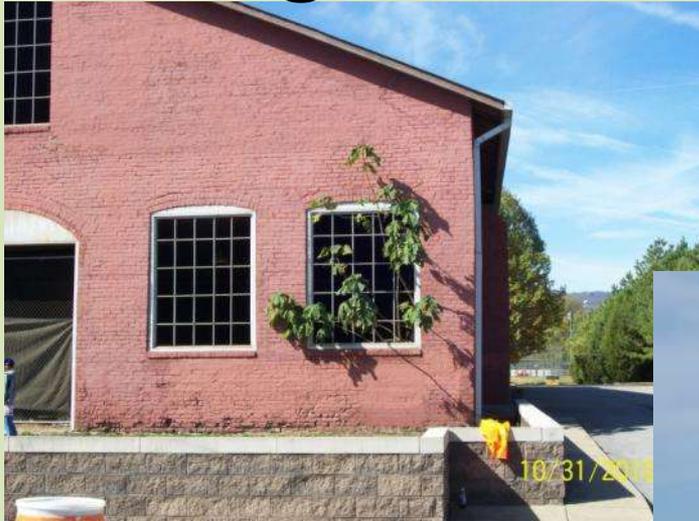
School
Parking
Lot
Storage



- Finley Stadium Pervious Pavement Chattanooga



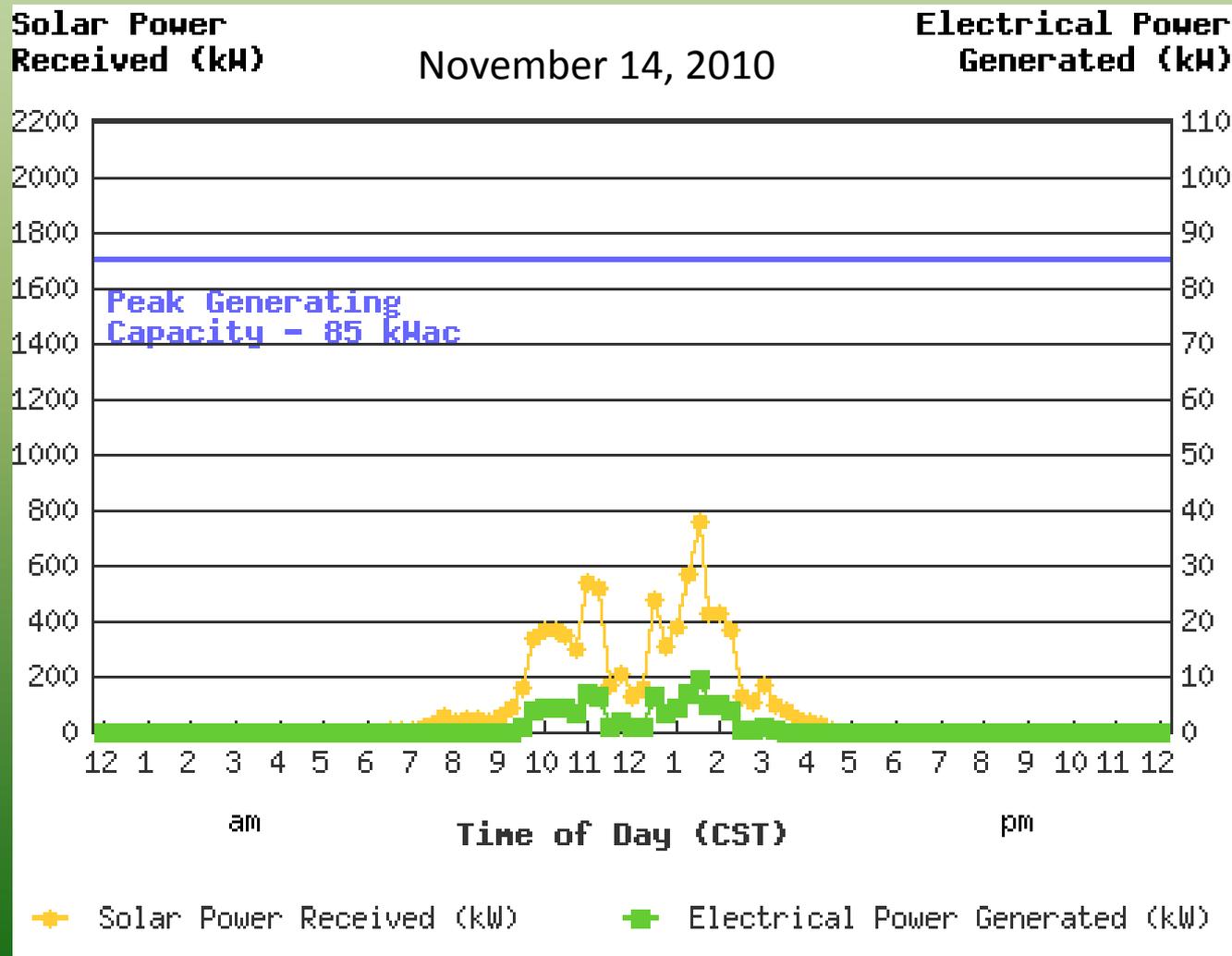
- Finley Stadium Stormwater Storage Buildings - Chattanooga



- Finley Stadium Solar Collectors
Chattanooga



- Finley Stadium Solar Collectors
Chattanooga



Generates enough power for 9 homes

One of 16 TVA solar installations

- Chattanooga riverfront bridge/parking



- Chattanooga building cut in half by 4TH St



- Chattanooga LEED certified downtown theatre



20 questions about sustainability

Is the United States capable of environmentally beneficial long-term infrastructure services? Can a nation with so many and sometimes overlapping levels of government manage a finite resource — such as water — without conflict?

Is the average person interested in learning why a two-year-old road is scheduled for repair before his pothole-pitted street? Does he care what happens to his garbage? How long will it be before your community must weigh the environmental degradation caused by road salt against the loss of a human life?



True sustainability requires cross-jurisdictional and functional solutions, a tough proposition for a nation that so highly values self-determination.

Can a capitalistic society force manufacturers to sacrifice profit margin by requiring them to help dispose of their product? If not, are consumers willing to pick up the slack?

Does the resident complaining about his “rain tax” understand why his community formed a stormwater utility? Does he know that we’ve demanded that our elected representatives enact laws to make rivers and lakes safe to swim and fish in? Our tap water nontoxic?

Can farmers make a living without constantly resupplying depleted soil with nitrogen and phosphorus?

Did you know that half of San Diego’s residents say they’d drink treated wastewater if it meets safety standards? Does the

average sewer and water customer know that a lot of treated effluent is cleaner than the body of water to which it’s discharged?

How many residents would pay a little extra every month so their local drinking or wastewater treatment plant can install more energy-efficient equipment? How many of your employees wouldn’t feel threatened by a major upgrade?

Is everyone on your team willing to explore alternatives outside his or her comfort zone? Are you? Do your elected officials solicit your advice? Do they *hear* you?

Can the social animal *homo sapiens* resist the urge to jump on the bandwagon when everybody else is? Who has the authority to slow things down so stakeholders can consider the long-term ramifications of the latest fad? Is raising the issue worth the possibility of losing your job?

How does one discuss the concept of “sustainability” with a class of professionals whose entire career is devoted to making the most of limited resources? Without insulting them, that is.

What do you think? Let me know at sjohnston@hanleywood.com.

Can the individual human ego take a back seat to the greater good?



Stephanie Johnston

Stephanie Johnston, Editor in Chief

20 questions about sustainability

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20 questions about sustainability

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10. Our tap water non-toxic?



20 questions about sustainability



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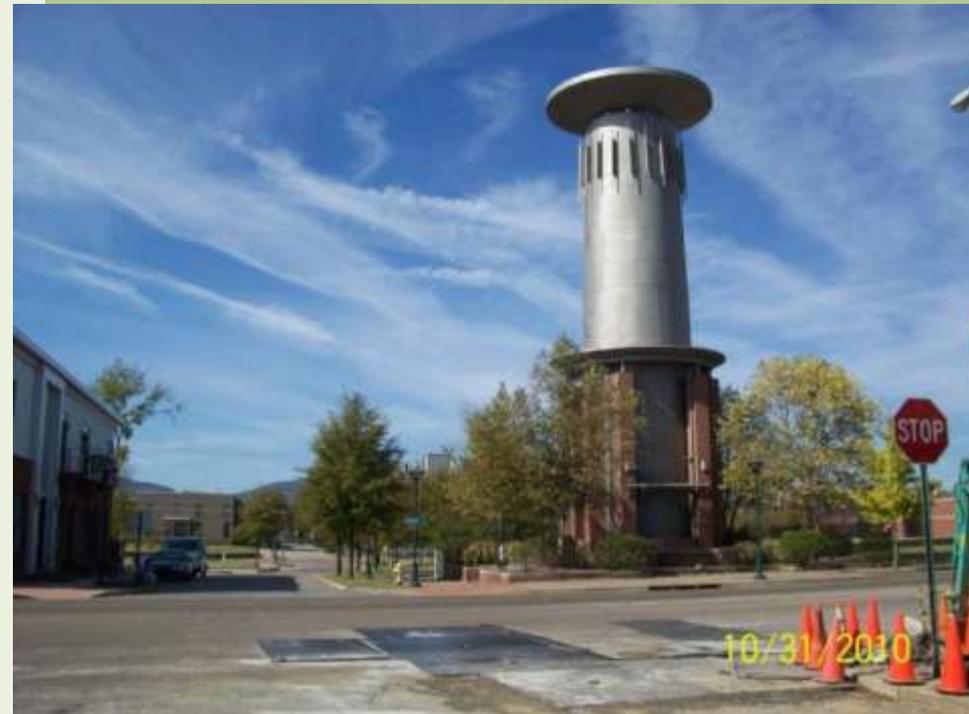
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Headworks

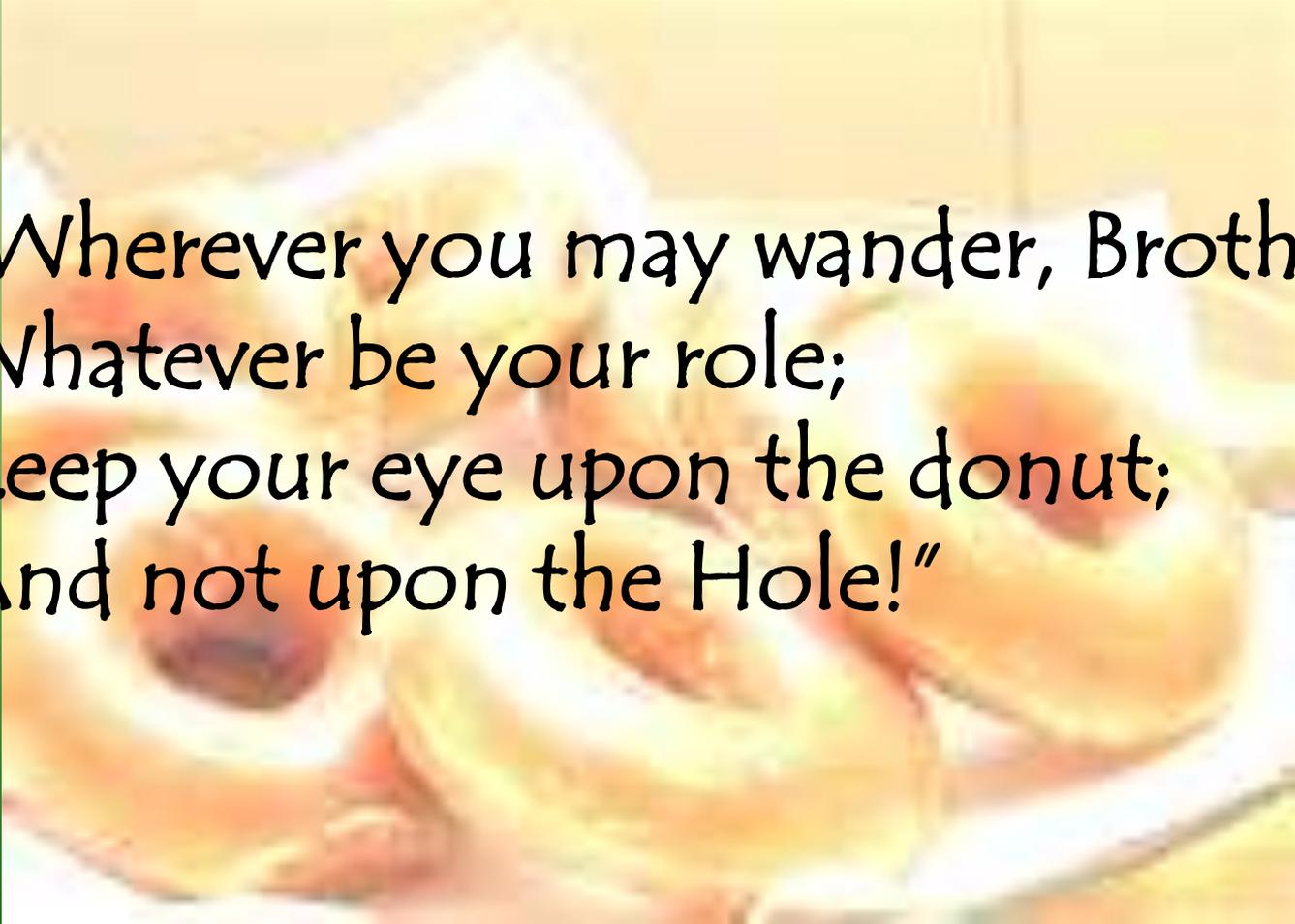
PW Editorial

20 questions about sustainability

15. Is everyone on your team willing to explore alternatives outside his or her comfort zone? Are You?
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17. Can the social animal *homo sapiens* resist the urge to jump on the bandwagon when everybody else is?
18. How do you slow things down so stakeholders can consider the long-term ramifications of the latest fad?
19. Is raising the issue worth the possibility of losing your job?
20. How does one discuss the concept of "sustainability" with a class of professionals whose entire career is devoted to making the most of limited resources without insulting them?



Wisdom from a donut box



"Wherever you may wander, Brother;
Whatever be your role;
Keep your eye upon the donut;
And not upon the Hole!"

**For copy of this presentation, go to the Town
of Collierville web page at
www.Collierville.com**

FINIS