Tools & Resources supporting Green Infrastructure

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Sustainable Water Infrastructure Program
~Federal Green Challenge Water Webinar~
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EPA Region 9 Sustainable Water Infrastructure Program

Providing technical support and financial resources to our communities to increase water and energy efficiency in water, wastewater, and stormwater infrastructure.

• Major Challenges to water & wastewater systems:
  • Water Scarcity
  • Climate Change
  • Increasing Population
  • Energy Uncertainty
  • Aging Infrastructure

• Interconnected challenges, e.g. Water/Energy Nexus

<table>
<thead>
<tr>
<th>California</th>
<th>U.S.</th>
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<tr>
<td>~20% of electricity</td>
<td>~2% of national energy consumption</td>
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<tr>
<td>~30% of natural gas</td>
<td>~70 billion kWh</td>
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Green Infrastructure (GI)/Low Impact Development (LID):
Tools for mitigating sewer overflows, reducing energy use and improving permit compliance by using natural or engineered systems to capture, cleanse, and reduce stormwater runoff.

GI/LID approaches:
- Reduce heat island effect
- Improve water quality in streams and rivers
- Recharge aquifers
- Reduce pollutants in storm water
- Sequester Carbon
- Increase wildlife habitat, preserve sensitive environmental areas
- Preserve pre-development hydrology
- Reduce water/energy load of water infrastructure
Tools & other Resources Supporting LID

Cost-Benefit Resources: http://water.epa.gov/infrastructure/greeninfrastructure/gi_costbenefits.cfm

- Cost Analyses
- Cost Benefit Analyses
- Tools
  - e.g. Green Values National Stormwater Management Calculator

<table>
<thead>
<tr>
<th>Green Improvements</th>
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<tbody>
<tr>
<td>Green Roof</td>
<td><img src="image1.png" alt="Green Roof" /></td>
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<tr>
<td>Planter Boxes (disconnect downspout)</td>
<td><img src="image2.png" alt="Planter Boxes" /></td>
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<tr>
<td>Rain Garden (disconnect downspout)</td>
<td><img src="image3.png" alt="Rain Garden" /></td>
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<tr>
<td>Cisterns / Rain Barrels (disconnect downspout)</td>
<td><img src="image4.png" alt="Cisterns" /></td>
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<tr>
<td>Native Vegetation</td>
<td><img src="image5.png" alt="Native Vegetation" /></td>
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<tr>
<td>Vegetation Filter Strips</td>
<td><img src="image6.png" alt="Vegetation Filter Strips" /></td>
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<tr>
<td>Amended Soil</td>
<td><img src="image7.png" alt="Amended Soil" /></td>
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<tr>
<td>Roadside Swales (elimination of curb and gutter)</td>
<td><img src="image8.png" alt="Roadside Swales" /></td>
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<tr>
<td>Trees</td>
<td><img src="image9.png" alt="Trees" /></td>
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<tr>
<td>Swales in Parking Lot</td>
<td><img src="image10.png" alt="Swales in Parking Lot" /></td>
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<tr>
<td>Reduced Street Width</td>
<td><img src="image11.png" alt="Reduced Street Width" /></td>
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<tr>
<td>Permeable Pavement on Parking</td>
<td><img src="image12.png" alt="Permeable Pavement on Parking" /></td>
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Tools & other Resources...cont’d

Design & Implementation Resources:
http://water.epa.gov/infrastructure/greeninfrastructure/gi_design.cfm

• Design Manuals
• Design Tools
  – e.g. WERF’s SELECT & BMP and LID Whole Life Cost Models
• Design Challenges
  – Clay or Glacial Till
  – Poor Urban Soils
  – Brownfield Sites
  – Sediment Laden Stormwater
  – Cold Weather
  – Limited Water Supply for Irrigation
  – Space Constraints
• Implementation
• Operations and Maintenance
• Homeowner Resources
Tools & other Resources...cont’d

Modeling Tools:

http://water.epa.gov/infrastructure/greeninfrastructure/gi_modelingtools.cfm

- Simpler Models
  - EPA’s National Stormwater Calculator
  - USDA’s i-Tree Vue
- More complex models to evaluate multiple parameters
  - EPA Stormwater Management Model (SWMM) with LID Controls
  - EPA System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN) Model
  - EPA Hydrological Simulation Program – FORTRAN (HSPF)
Tools & other Resources...cont’d

Other resources:

• Policy Guides:
  [http://water.epa.gov/infrastructure/greeninfrastructure/gi_policy.cfm](http://water.epa.gov/infrastructure/greeninfrastructure/gi_policy.cfm)

• Case Studies:
  [http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm#tabs-4](http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm#tabs-4)

• Research:
  [http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm#tabs-5](http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm#tabs-5)

• Library:
  [http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm#tabs-6](http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm#tabs-6)
Use your WaterSense to save Water in Federal Facilities
Saving Water Provides Multiple Benefits

• Water efficiency increases resilience to water shortages caused by drought
• Water, sewer, and energy costs are rising; water efficiency helps reduce these operating costs
• Saving water saves energy
  – Every gallon of water has an energy footprint associated with providing the service and at the end use
• Energy for Water
  – Pumping
  – Treating
  – Heating
End Uses of Water in Commercial Facilities

Created by analyzing data from: New Mexico Office of the State Engineer, American Water Works Association (AWWA), AWWA Research Foundation, and East Bay Municipal Utility District
WaterSense Vision

- All Americans will understand the importance of water efficiency and take positive actions to reduce their water use – in their homes, outdoors, and at work

- How will we achieve it?
  - By transforming the marketplace for products and services that use water
  - By promoting a nationwide ethic of water efficiency to conserve water resources for future generations and reduce water infrastructure costs
WaterSense Labeled Products

Flushing Urinals
Lavatory Faucets
Irrigation Controllers
Pre-rinse Sprayers
New Homes

More than 14,000 Labeled Product Models

Tank-Type Toilets
Showerheads

Water factors are also included in many ENERGY STAR qualified products
WaterSense, ENERGY STAR® and FEMP

• WaterSense, ENERGY STAR, and FEMP designated products complement each other to meet executive order goals.

• Water factors are included in many ENERGY STAR qualified products
  – Ice machines
  – Steam cookers
  – Dishwashers
  – Clothes washers

• FEMP designates products in all categories, but defers to all final WaterSense and ENERGY STAR standards
  [Link](http://www1.eere.energy.gov/femp/technologies/eepl purchaserspecs.html)
WaterSense Resources

All federal agencies can be WaterSense partners

• Access to free promotional materials, tools, campaigns, partner webinars and newsletters

• Product listings, outdoor water budget tool, and technical specifications

• Best Management Practices and Manuals

http://www.epa.gov/watersense/commercial
Water Efficiency Best Management Practices

Step 1: Make a Commitment
Step 2: Assess Facility Water Use
Step 3: Set and Communicate Goals
Step 4: Create an Action Plan
Step 5: Implement the Action Plan
Step 6: Evaluate Progress
Step 7: Recognize Achievement

Aligns with ENERGY STAR’s Guidelines for Energy Management...so just add water to your programs!

www.energystar.gov/index.cfm?c=business.bus_index
Water Efficiency Best Management Practices

• Each of 36 BMPs provides:
  – An overview of the technology
  – Operation, maintenance, and user education tips
  – Retrofit and replacement options
  – Calculations for potential water, energy, and dollar savings and payback

• 7 case studies outline success stories in major BMP areas
WaterSense Information

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