

# Water and the Urban Landscape:

*Connections Between Greener,  
Energy Efficient Buildings and  
WATER*

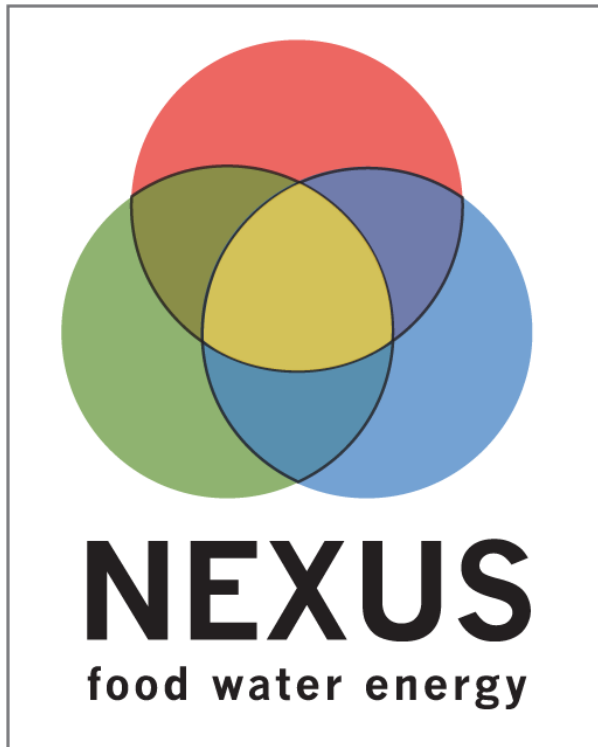
Experts Talk Series  
Sustainable Jersey City  
September 3, 2013

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# It's All Connected



- Strain and conflict between our food, water and energy systems.
- Recent events like droughts, oil spills and increasing food prices make clear the US can no longer view these systems in isolation.
- Where these systems interconnect and the interplay between them is called the *Nexus*.
- Focus: Connections between energy and water; Steps we can take to make more sustainable built environment.

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# Nexus: Food, Water, Energy

Watch two animated videos that provide a Nexus overview:

“The Water Food Energy Nexus – an animation,”

SABMiller:

(<http://www.youtube.com/watch?v=uCA08yga5NM>)

“Water, Energy, Food – Nexus Thinking Explained,”

IIEA:

(<http://www.iiea.com/blogosphere/nexus-thinking-the-environment-nexus-explained-video-infographic>)

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# Why does the Nexus matter?

- **Resource constraints:** More people (2-3 billion) — Higher income/consumption — Climate change — Pollution (increase in certain areas).
- **By 2030: 30% more water; 40% more energy; 50% more food.**
- **Potential water and food shortages.** 1) Water-use restrictions; 2) The 2007-2008 global food shortage.
- **Prices could rise (or become volatile) for food, water, gas/electricity — can affect other goods and services.**

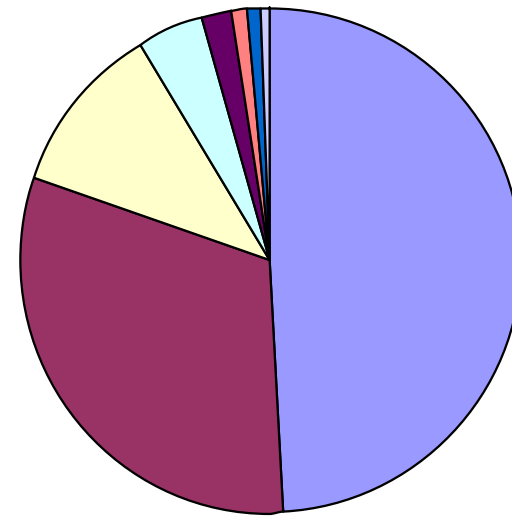
# How Water is Used in the USA

- **Thermoelectric: 49%**
- **Irrigation: 31%**
- **Public supply: 11%**
- **Industry: 4%**
- **Aquaculture: 2%**
- **Domestic (self-supplied): 1%**
- **Mining: 1%**
- **Livestock: Less than 1%**

**SOURCE:** USGS:

*Estimated Use of Water in the United States in 2005*

United States' Water Use by Sector, 2005



Thermoelectric power 49%	Irrigation 31%
Public supply 11%	Industry 4%
Aquaculture 2%	Mining 1%
Domestic 1%	Livestock <1%

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# The Water-Energy Nexus

## *Water for Energy:*

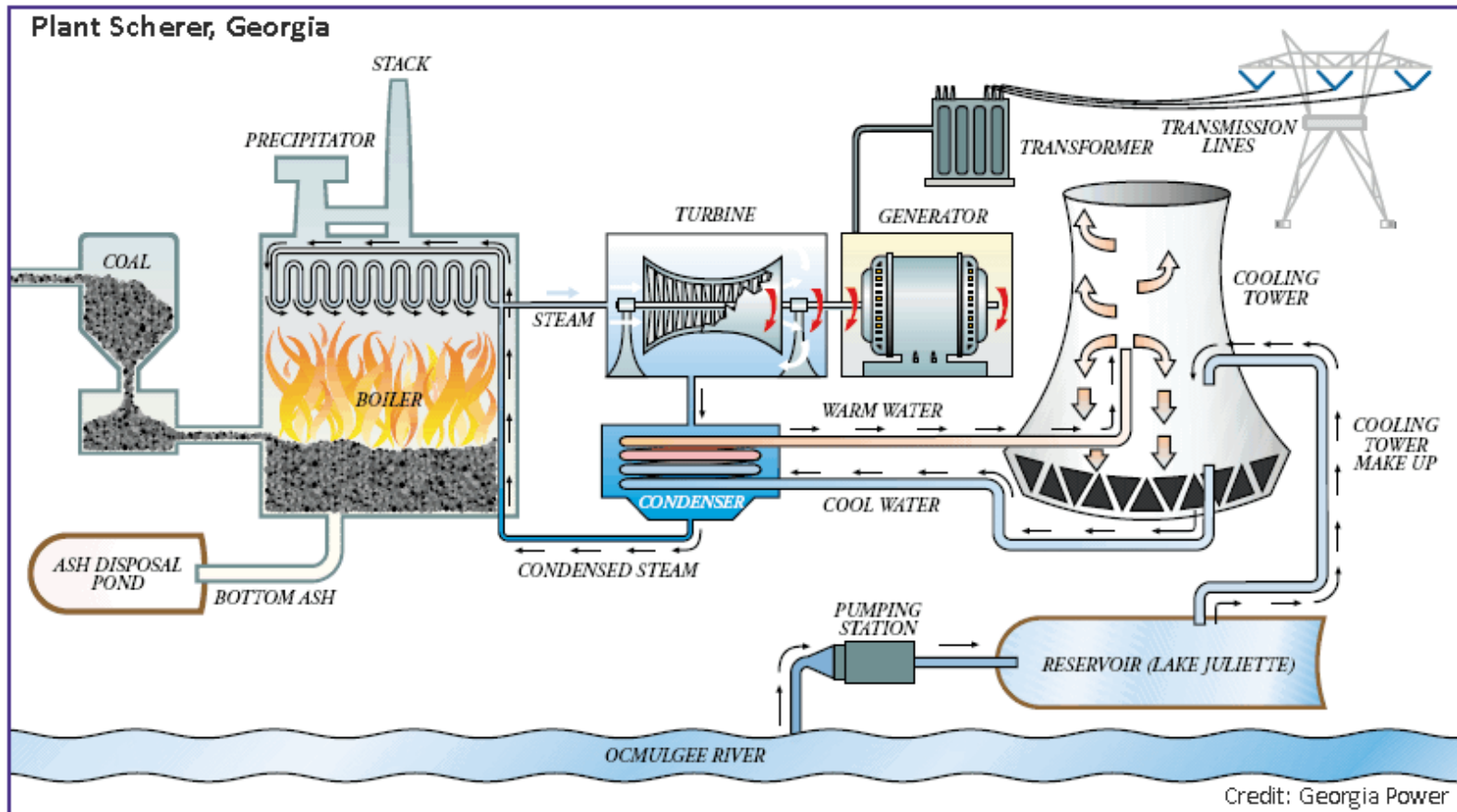
- Conventional thermoelectric power plants (coal, oil, natural gas and nuclear power);
- Hydropower;
- Fuel extraction, refining and production.

## *Energy for Water:*

- Energy to extract, move and treat water for drinking and irrigation (13% of our total energy budget);
- Wastewater collection, treatment and disposal of;
- Water is used by households and industry, especially through heating and cooling.

# Energy needs Water

e.g., Coal-Fired Thermoelectric Power Plant



SOURCE: USGS: <http://ga.water.usgs.gov/edu/wupt-coalplant-diagram.html>



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# Water needs Energy

e.g., Wastewater Treatment Plant



Photo credit: [eutrophication&hypoxia](#)



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# Water Footprints for Energy Technologies

## Energy Technologies and Water Consumption (estimated):

- Nuclear power – 43 gallons per kilowatt-hour
- Coal-fired power – 36 gallons per kilowatt-hour
- Natural gas-fired power – 15 gallons per kilowatt-hour
- Solar thermal, water-cooled – more water than coal
- Solar thermal, air cooled – water use for steam
- Biomass irrigated – 100 to 600 gallons per kilowatt-hour
- Biomass un-irrigated – water for steam
- Hydroelectric – water remains (evaporation varies)
- Wind power – negligible water use
- Solar photovoltaic – negligible water use

**SOURCE:**  
National Renewable  
Energy Laboratory via  
Circle of Blue

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# Sustainable path(s) forward

- **Water footprinting** as an example of nexus thinking.
- **Cities at the forefront** of sustainable change (“Cities as laboratories”).
- **New models of service provision** and consumption/use, pricing are the reality for municipalities, companies, developers, etc.
- **Sustainable building design** and operation use a nexus approach to improve water and energy efficiency.
- **Efficiency must be status quo of built environment**, not simply viewed as an added feature.
- **Conservation ethic** must be nurtured in society. (Uneven resource distribution with no uniform problems/solutions; site/community-specific.)

# Sustainable Cities (built environment)



**SOURCE:** Surdna.Infographic by [Keri Rosebraugh](#), an artist and illustrator who focuses on sustainable industries and environmental themes.

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# What can you do? Choices, choices...

## Energy Choices

- Get an Energy Audit.
- Switch it off.
- Purchase energy efficient products (Energy Star label)
- Go renewable! (New Jersey is a solar hotspot.)
- EPA Green Power Locator to choose green power options through your utility. ([www.epa.gov/greenpower](http://www.epa.gov/greenpower))

## Water Choices

- Get a Water Audit.
- Turn of the tap. (less water at home – e.g., by using low-flow showerheads and repairing leaks right away – less water goes down the drain and has to be piped to and cleaned at the treatment plant.)
- Buy less stuff.
- Avoid bottled water. (equivalent of 17 million barrels of oil for plastic)

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# Saving Water Saves Energy, Saving Energy Saves Water



Letting a faucet run for  
**five minutes**  
uses as much energy as  
leaving a  
**60-watt light bulb**  
on for  
**22 HOURS**



 EPA  
[epa.gov/watersense](http://epa.gov/watersense)

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# Take Action and Resources

GRACE, Take Action page:

<http://www.gracelinks.org/2254/take-action>

Food, Water, Energy: Know the Nexus:

<http://www.gracelinks.org/1802/issue-paper-know-the-nexus>

Distributed Renewable Energy Systems:

<http://www.gracelinks.org/2687/distributed-renewable-energy-systems-introduction>

ICLEI – Local Governments for Sustainability:

<http://www.iclei.org/>

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# Other GRACE Resources

GRACE Water Footprint Calculator

<http://www.gracelinks.org/1408/water-footprint-calculator>

Eat Well Guide

*(over 25,000+ listings of sustainable eateries, farmers markets, etc.)*

<http://www.eatwellguide.org/>



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# For More Information

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*connecting food, water & energy*

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