

#### US WATER INFRASTRUCTURE ECONOMICS



Arka Pandit Messner Project

### Water Sectors and their Status:

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Water Sector:	<u>Grade (US ): G</u>	rade (GA):
Drinking (Potable) W	ater D-	C+
Wastewater	D-	С
Municipal Wastewate	r	
Industrial Wastewater		
Stormwater	_	D+

Georgia doing slightly better than US average, but still not in good shape.



### Why invest in Water Infrastructure?

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- Investment in water and wastewater systems pay substantial dividends to the environment, public health and the economy.
- Since the mid1970s, investments made in drinking water systems prevented 2 – 4.7 million cases of gastrointestinal illness per year<sup>1</sup>.
- US portion of the Great Lakes generate about \$7.0 billion and support 75K jobs in the fishing industry.
- Economic losses were estimated at \$4.0 billion for the 1998 beach closure in New York and New Jersey.





# Category wise requirement for Wastewater sector:

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CWNS 2004 total documented needs (January 2004 dollars in billions)

Source: Clean Watersheds Needs Survey (CWNS), 2004 Report to Congress, US EPA

# State wise distribution of investment requirement for Wastewater sector:



#### Distribution of total documented needs by State (January 2004 dollars in billions)

Source: Clean Watersheds Needs Survey (CWNS) ,2004 Report to Congress, US EPA



# State wise distribution of investment requirement for Stormwater sector:



#### Distribution of total documented needs by State (January 2004 dollars in billions)

Source: Clean Watersheds Needs Survey (CWNS) ,2004 Report to Congress, US EPA

# System wise requirement for Drinking water sector:



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#### Total 20-Year Need (in billions of January 2003 dollars)

System Size and Type	Need
Large Community Water Systems (serving over 50,000 people) <sup>1</sup>	\$122.9
Medium Community Water Systems (serving 3,301 to 50,000 people) <sup>1</sup>	
Small Community Water Systems (serving 3,300 and fewer people) <sup>1, 2</sup>	
Costs Associated with the Recently Promulgated Arsenic Rule <sup>3</sup>	
Not-for-profit Noncommunity Water Systems <sup>4</sup>	
American Indian and Alaska Native Village Water Systems <sup>4, 5</sup>	
Subtotal National Need	\$266.9
Costs Associated with Proposed and Recently Promulgated Regulations (Taken from EPA Economic Analyses)	
Total National Need	\$276.8

Source: Drinking Water Infrastructure Needs Survey and Assessment, 2003 Report to Congress, US EPA

### Distribution of investment required:

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#### Total 20 year need by projects:

# Transmission and Distribution \$183.6

#### 20 year Regulatory and Non-Regulatory need:



#### Both graphs are in billions of January 2003 dollars

Source: Drinking Water Infrastructure Needs Survey and Assessment, 2003 Report to Congress, US EPA

### Some economic facts:

- There being no increase in investment, annual shortfall for different sectors in capital infrastructure:
  - Drinking Water: \$11.00 Billions
  - Wastewater: \$13.00 Billions
  - However, this does not take into account any growth in the demand for the next 20 years.
- \$390.00 billions need to be spent on replacing aging wastewater infrastructure systems and building new facilities in the next two decades.
- Federal assistance though the drinking-water state revolving loan fund (SRF) program was \$9.80 billions in total, from 1997-2008, which is slightly more than the projected annual gap for those years.

### Why is the need so large?

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- Increasingly stringent federal requirements to improve water quality and drinking water safety.
- Increasing water supply costs as least-cost sources are depleted and the quality of raw water declines.
  - Increased requirement of material and energy to use more complex technologies in order to achieve the desired standard.
- Cost of replacing aging and failing water distribution systems and waste-water collection systems for the first time.



### Impact of the Investment:

The impact of the investment can be categorized in four major categories:

- Economic Impact
- Environmental Impact
- Human Health Impact





#### **Economic Impact:**

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- Direct investment on the order of \$10 billion in water/ energy efficiency programs has the potential to boost U.S. GDP by \$13 to \$15 billion and employment by 150,000 to 220,000 jobs.
- The U.S. Conference of Mayors estimates that every job created in rebuilding our water systems creates nearly 3.7 jobs elsewhere, and every dollar invested in water infrastructure adds \$6.35 to the national economy.







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#### Distribution of Benefits from \$10 Billion of Direct Investment in Water/ Energy Efficiency Programs

Economic Sector (2-digit NAICS)	GDP (Million \$)	Employment (Jobs)
Ag, Forestry, Fish & Hunting	\$89	1,706
Mining	\$181	591
Utilities	\$232	438
Construction	\$1,112	16,917
Manufacturing	\$2,313	24,315
Wholesale Trade	\$1,016	8,353
Retail Trade	\$1,398	24,768
Transportation & Warehousing	\$357	5,235
Information	\$431	2,459
Finance & Insurance	\$753	5,594
Real Estate & Rental	\$1,054	5,500
Professional- Scientific & Tech Svcs	\$818	9,123
Management of Companies	\$305	2,242
Administrative & Waste Services	\$682	18,191
Educational Svcs	\$57	1,651
Health & Social Services	\$437	8,328
Arts- Entertainment & Recreation	\$78	2,059
Accommodation & Food Services	\$220	7,077
Other Services	\$1,113	17,548
Government & Non NAICs	\$857	13,409
Total	\$13,501	175,504

Source: Transforming Water: Water Efficiency as Stimulus and Long-Term Investment, Alliance for Water Efficiency, 2008



# Comparison of investment made and projects ready for start:

- The Stimulus Bill, contained \$2.0 billion in new funds for the Drinking Water State Revolving Fund (SRF) program and \$4.0 billion for the wastewater SRF program.
- AWWA had identified more than \$10.0 billion in "shovel-ready" drinking water projects that the stimulus funds could benefit and they could start as early as within 120 days of receiving the fund.



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### **Environmental Impacts:**

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- The eradication of Combined Sewer systems would negate the chances of Combined Sewer overflow, a major cause of watershed impairment.
- Eutrophication being a major global issue, tertiary treatment of wastewater effluent is required to meet the standard<sup>1</sup>. Portions of the Gulf of Mexico between Texas and Florida is so hypoxic that it is detrimental to the fish population there.
- Ensuring a healthy ecosystem thus preserving biodiversity.



### Human Health Impacts:

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- Pharmaceutical and personal care products are increasingly being found in the water supplies, which requires advanced treatment techniques to ensure the water safety.
- While the population is on the increase, current infrastructure fails short to meet the present need. An adequate infrastructure is required to serve the population without risking human health.





#### **Limitation of Local Revenue:**

Limitation of local revenue generation can be attributable to:

- Public misperception of need
- Political resistance to change in fee structure
  - 22% of US population pay over 4% their annual income for water and wastewater (considered to be the affordability limit)
- Equity and affordability issues



### Benefits of a Federal Role:

#### Size of the challenge

- The sheer magnitude of the anticipated funding provides enough rationale for federal involvement.
- Validation of needs
  - Increases the public awareness
- Program Stability and Predictability
- Varied options of financing



#### **Conclusions:**

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"If the nation fails to meet the investment needs of the next 20 years, it risks reversing public health, environmental, and economic gains of the past three decades."

- America's Infrastructure report Card, ASCE, 2009.



#### **References:**

- 2009 ASCE Georgia Infrastructure Report Card
- America's Infrastructure report Card, ASCE, 2009
- AWWA Issue Agenda, Job creation
- 'Sudden Impact' a Clean Water Council Report, 2009
- 'Transforming Water: Water Efficiency as Stimulus and Long-Term Investment', Alliance for Water Efficiency, 2008
- 'Clean & Safe Water for the 21st Century' A Water Infrastructure Network Report
- 'Drinking Water Infrastructure Needs Survey and Assessment', Third Report to Congress, Environmental Protection Agency (2005).
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