

CEE 3<sup>rd</sup> Annual Industry Partners Meeting  
September 19-20, 2006  
Dallas, TX

## Municipal Water & Wastewater Breakout Session Part II: "Optimization of Key Pumping Systems"

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Wednesday, September 20, 2006



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## Electricity Consumption in Water and Wastewater Systems

Raw Water Pumping &  
Water Treatment



350 kWh/MG

Pump to Distribution  
System

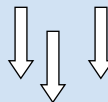


1150 kWh/MG

**Anytown**

National avg. for energy use in  
water = 1500 kWh/ MG

Pump to Wastewater  
Treatment Plant



150 kWh/MG

Wastewater Treatment



1050 kWh/MG

1 MG wastewater generated by 10,000 people per day  
1 MG (million gallons) serves 5,000 people per day

National avg. for energy use in  
wastewater = 1200 kWh/MG



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## Wastewater Systems

- Out of 16,000 publicly owned treatment works (POTWs), approximately 1,600 of the largest serve most of us (processing +2.5 mgd each).
- Major processes:
  - collection systems (sewers & pumping stations)
  - wastewater treatment (primary, secondary, tertiary/advanced)
  - bio-solids processing, disposal or re-use
- Energy use is dominated by treatment process (aeration) and pumping
  - 70 percent of flow is treated with activated sludge
  - Higher levels of treatment use more energy
- Energy use affected by population, influent loading, effluent quality, process type, size, age, etc.



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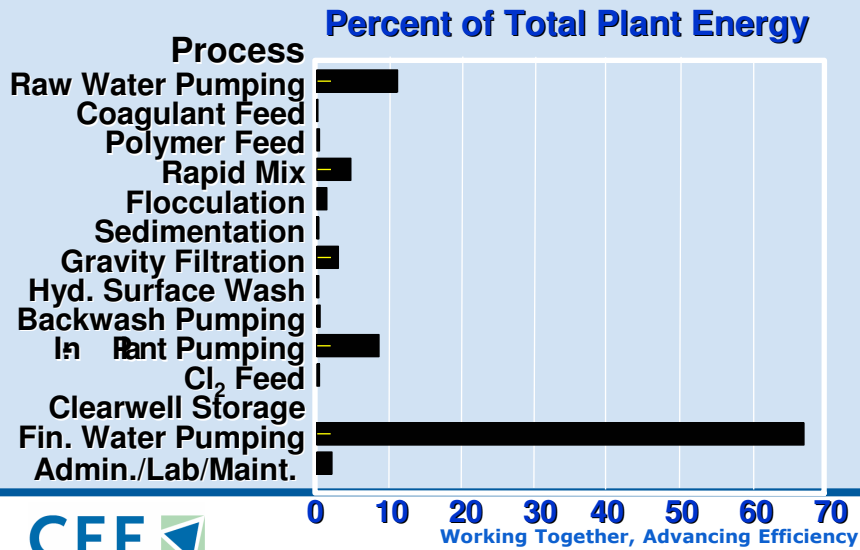
## Water Supply Systems

- Out of 60,000 community water systems, approximately 3,900 of the largest (+10K people) serve most of us (about 221 million)
- 85 percent are publicly-owned
- In general, larger systems use surface water; smaller systems use ground water
- Major processes: production, treatment (disinfection) and distribution
- Vast majority of energy is used for pumping rather than treatment; reducing water loss/leakage is a big opportunity for savings as well
- Energy use affected by: water source, quality, storage, elevation, distance, age, process etc.

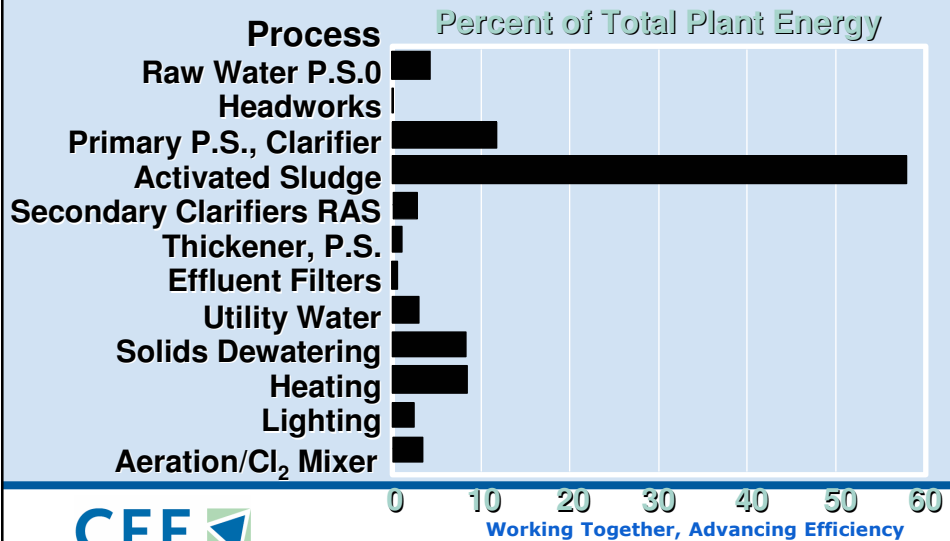


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## Relative Distribution in Water Treatment (10 mgd example)



## Relative Distribution of Plant Power -- 7.5 mgd WWTP



## CEE Industrial Initiatives Related to Pump Systems

- **CEE Premium-Efficiency Motors Initiative - 1996**
  - Defined high-efficiency motors using EPACT 1992 as a baseline (1-200 hp motors, 2-4-6 Pole Motors)
  - Aligned with NEMA Premium spec and brand 2001
- **CEE Motor Systems Initiative - 1999**
  - Identifying best practices for programs to adopt regarding pump, fan and compressed air systems
  - Raising awareness about the opportunity for savings
- **Motor Decisions Matter Campaign – 2001**
  - Collaborative effort with motor manufacturers, repair shops and distributors
  - Focused on promoting greater awareness of motor management, supporting cost-effective repair-replace decision-making in the market



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## Sector Approach to Motor System Efficiency

- **Municipal Water and Wastewater Initiative – 2005**
  - **Pump system optimization**
    - Water transmission/distribution systems
    - Wastewater collection systems
  - **Blower system optimization**
    - Wastewater aeration systems
  - **Process efficiency opportunities**



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## **Types of Industrial Efficiency Programs that Address Pumping**

- Financial Assistance
  - Custom Incentives
  - Financing
  - Grants and Loan funds
- Education
  - Training/Seminars
- Supplier Assistance
  - Trade Allies Network
  - Service Providers
  - Product Providers
- Technical Assistance
  - Energy audits
  - Pump testing
  - Feasibility studies
  - Design assistance



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## **Areas of Common Interest with the Industries Serving the Water Sector**

- Recognize the municipal water and wastewater sector as a significant market opportunity (energy savings, sales, profitability)
- Agree that the benefits of energy-efficient pumping is under-valued in the market today and would like to see greater demand in the future
- Agree on the benefits of pump system efficiency
  - Recognize the value of NEMA Premium motors
  - Support system efficiency concept and use DOE resources
  - Recognize that technical resources are available through the pump industry (HI) and other sources



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## Status

- Seeking best practices that CEE members can incorporate into their programs and apply to the water/wastewater sector
  - Reviewing successful program strategies currently being implemented by members
  - Reviewing Pump System Improvement Modeling (PSIM) Tool
- Exploring opportunities to raise awareness among water & wastewater customers at the local and national level



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## Questions

- Do we have a common understanding of the water/wastewater market?
- Have we identified key opportunities (and drivers) to advance energy-efficiency in this market?
- Can we identify areas for cooperation that are of mutual interest and mutual benefit?



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## Overview of Today's Session

- Identifying and Delivering Pump System Energy Savings
  - Pump Industry Perspective, D. Flinton, ITT Goulds
  - Energy-efficiency Program Perspective, S. Jarman, Austin Energy
  - Guest Respondent, G. Hovstadius, ABS Pumps
- Discussion:
  - Potential Implications for Program Design and for Future Cooperation with Industry
- Meeting Wrap-up and Next Steps



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Thank you for your attention

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