

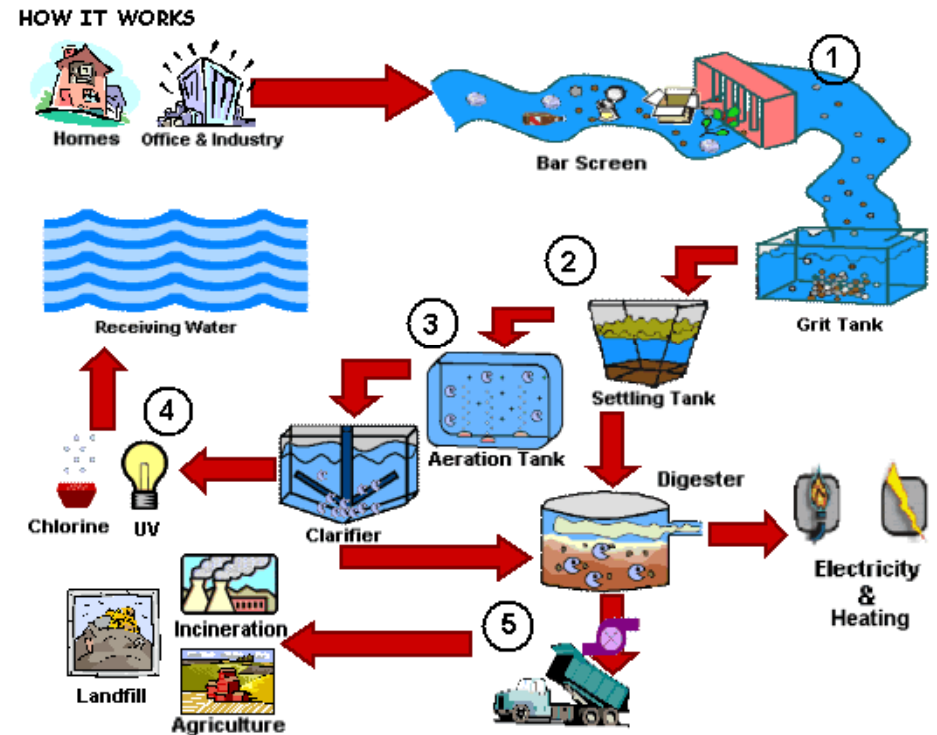
# Energy Demands and Opportunities for Wastewater Utilities

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# Wastewater Treatment

- Average American creates 100 gallons of wastewater per day
- 16,000 wastewater treatment plants in the U.S.
- 3,500 plants use anaerobic digestion

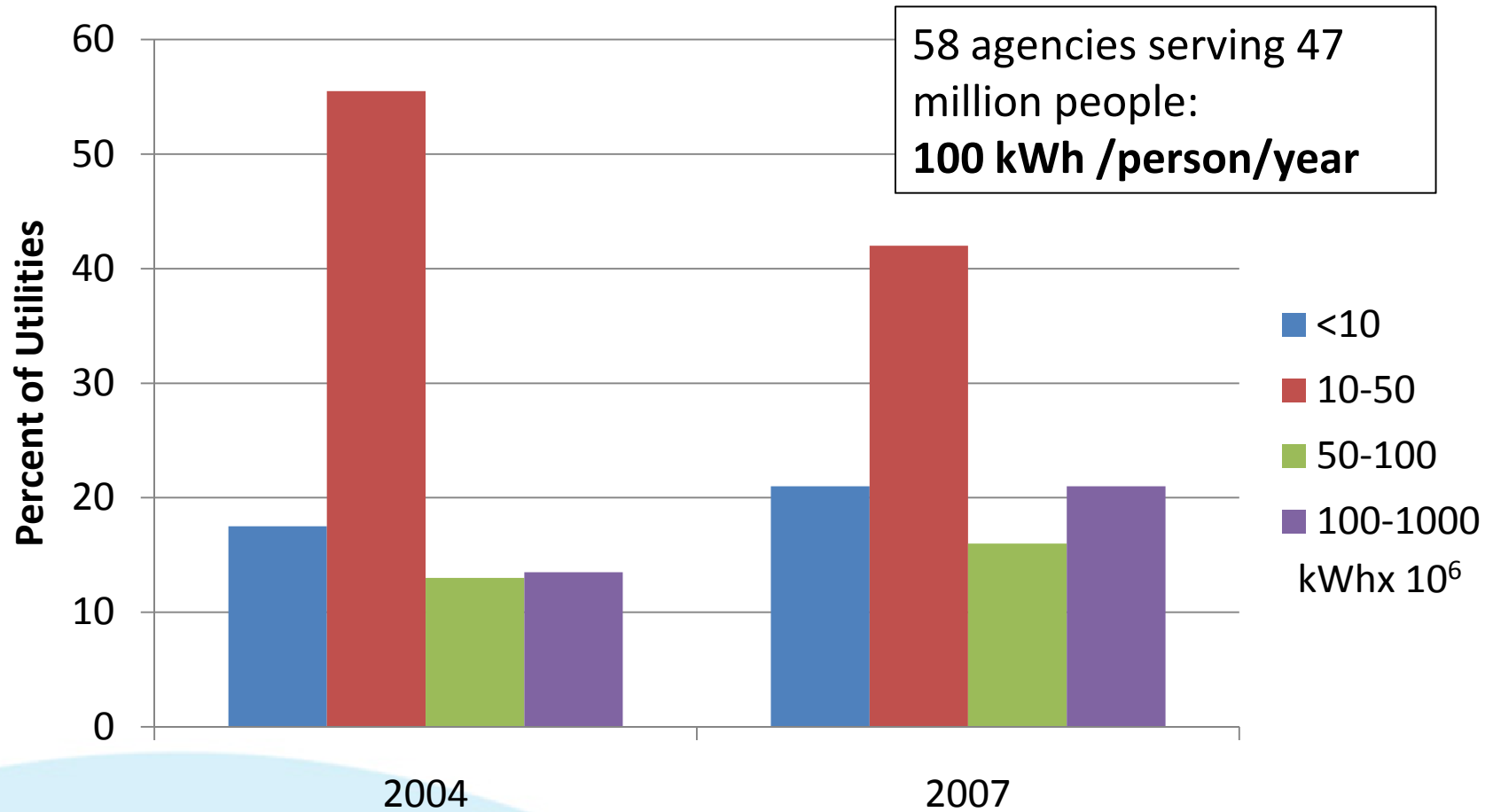


# National Association of Clean Water Agencies (NACWA)

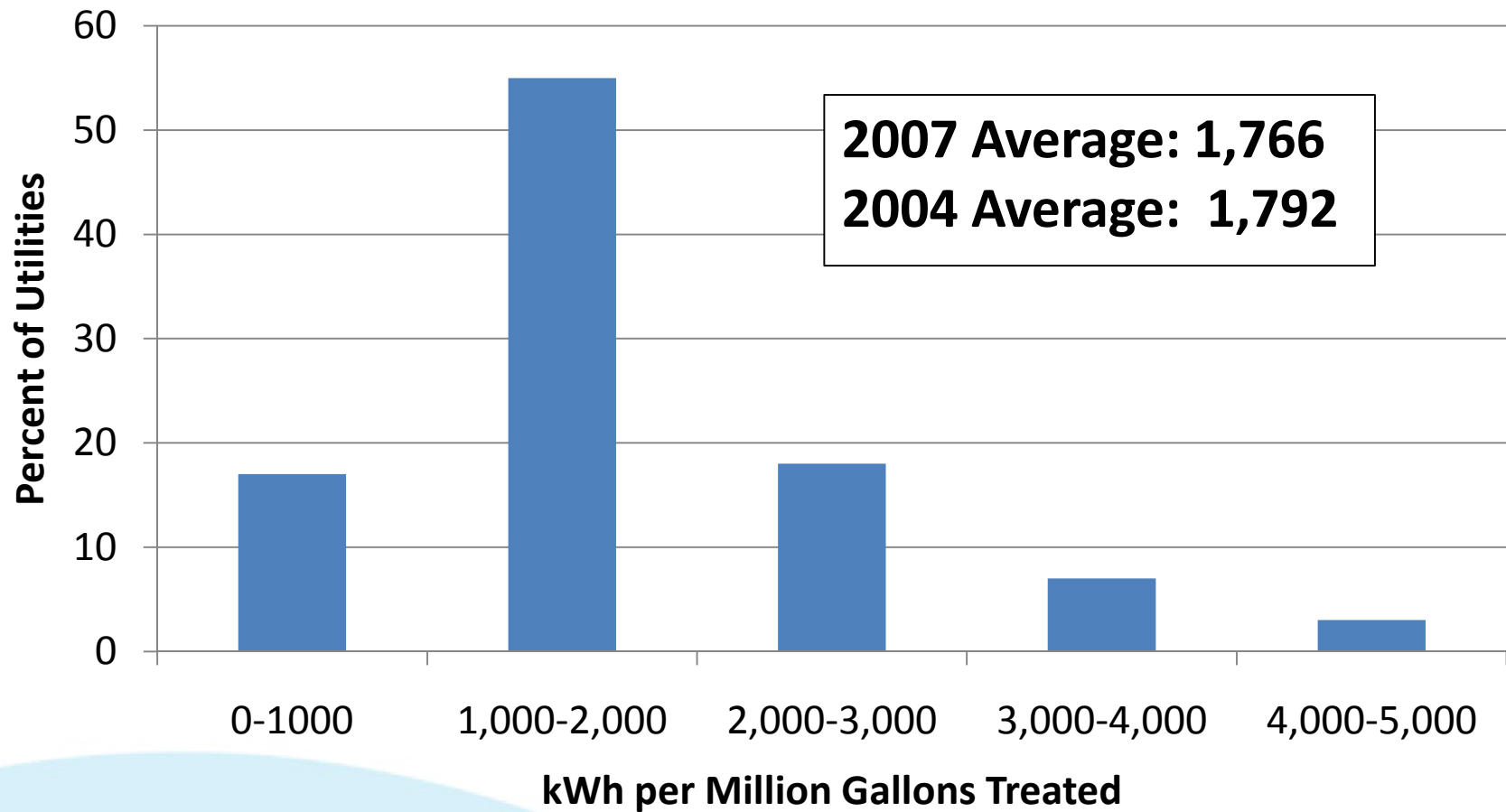
- Represents nearly 300 publicly owned treatment works (POTWs)
- Members serve:
  - Populations ranging from 1,700 to 7.5 million
  - The majority of the sewered population in the U.S.



# Electric Energy Use

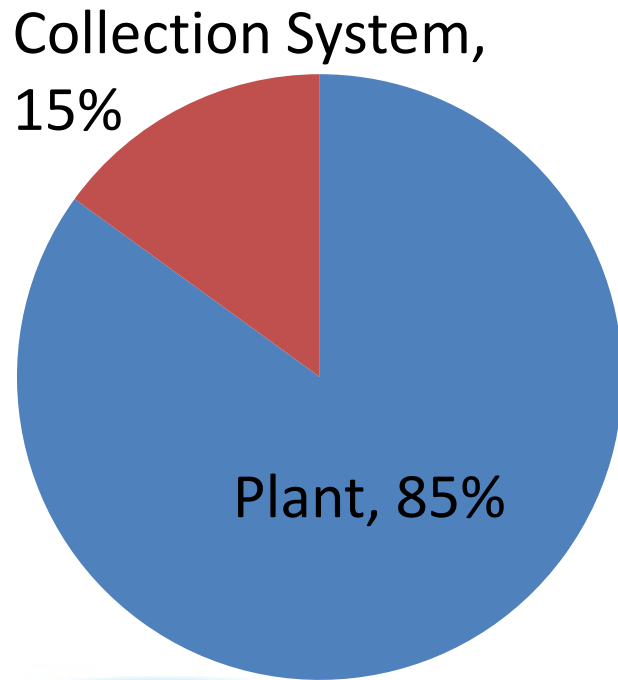


# Plant Energy Use per MG Treated

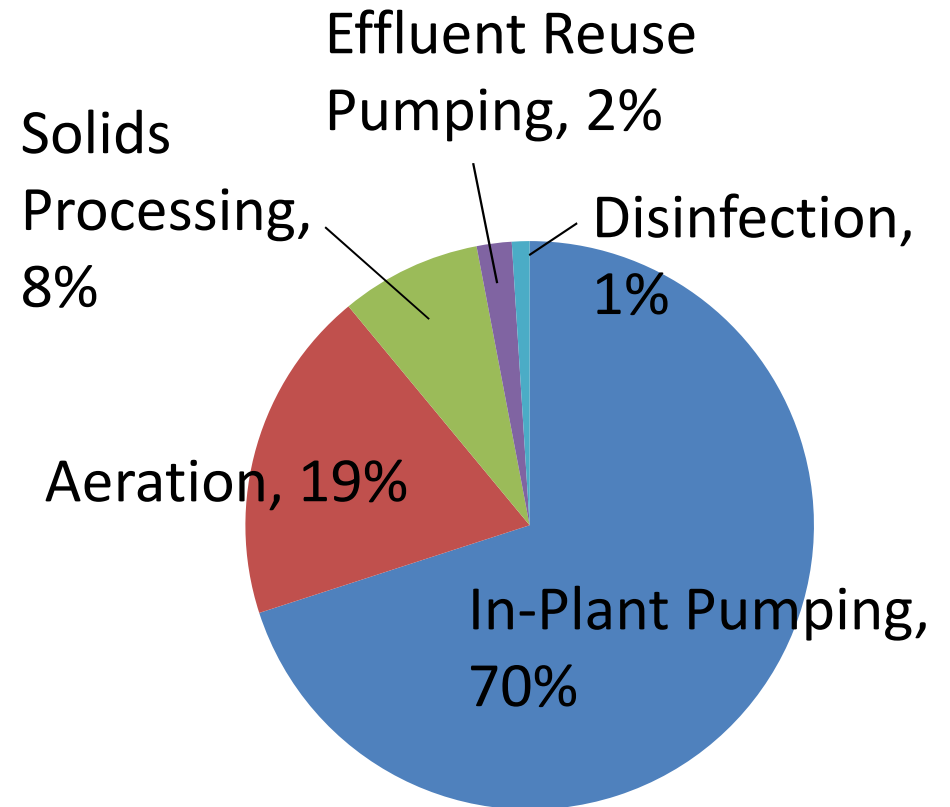


# Breakdown of Energy Usage

## Plant vs. Collection System



## Plant Process Use



# Energy Conservation and Cost Reduction

Method	Implemented	Planned	Energy Savings (MWh/yr)
Installation of high-efficiency pumps, motors, & variable frequency drives	70%	28%	24,270
Using SCADA systems to monitor and optimize energy needs	68%	24%	10,703
Use of efficient lighting and HVAC for plant and administrative buildings	60%	25%	10,080
Reduction of inflow/infiltration (I/I) to reduce plant flows	53%	26%	No data
Other plant process modifications to reduce energy use	43%	34%	1,990

# Energy Conservation and Cost Reduction

Method	Implemented	Planned	Energy Savings (MWh/yr)
Optimized purchasing strategies and load shifting to reduce peak demand	41%	14%	82
Heat recovery	39%	10%	14,330
Electricity generation – biogas fueled engines, microturbine, fuel cells	35%	24%	31,812
Installation of equalization basins to reduce peak demand	31%	11%	No data
Electricity generation – solar, wind turbine, hydropower	4%	14%	5,810



# Biogas Recovery and Use

- 57% of agencies recover biogas
- Uses for these agencies:
  - Digester Heating - 55%
  - Electric Power Generation - 50%
  - Building Heat/Cooling - 41%
  - Incineration - 9%



# Onsite Energy Production

- 45% of agencies generate electricity onsite
- Percentage of electricity needs generated onsite:
  - Average - 34%
  - Maximum - 96%



# Los Angeles County Sanitation District

- Joint Water Pollution Control Plant
  - Serves 3.5 million people
  - Produces 95% of energy needs (22 MW/yr)
    - 3 solar gas turbines
    - Turbines exhaust into heat recovery steam generators
      - Digester heating
      - Electricity production
  - Saves \$20 million/yr in retail power purchases



# East Bay Municipal Utility District

- Food scraps are added to anaerobic digesters to increase energy production
  - 100 tons of food scraps per day
  - Plans to increase to 200 tons/day
  - Produces 6 MW/yr (up from 2.5 MW/yr)



# Energy Potential of Biosolids

- Gasification of biosolids
  - Biosolids dried, pelletized, and converted to charcoal-like substance
  - Converted to gas at high temperatures
- Fuel for cement kilns
- Land application/compost



# Other Energy Issues

- Potentially higher energy costs due to climate change legislation
- Water quality impacts from production of ethanol



# Thank You



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