# Climate Change and Energy Efficiency: Let's Get Real

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# Part 1 – Overview (Ann Elsen)

- Mitigating Climate Change
- Levels of Jurisdiction
- Really Big Bugs
- RGGI
- Funding Sources in MD
- Lead-in to inventories and actions -> Rob

# Climate Change Mitigation

Impacts on Utilities, examples:

- Federal
  - carbon caps
  - national energy portfolio standards
  - investments in EE and AE
  - Shift to RE, nuclear, clean coal?
- State
  - RGGI
  - RPS
  - revenue from alternative compliance payments

# Opportunities & Challenges

- Investment – economic growth
- Efficiency improvements – improved competitiveness
- New technologies – improved operations and performance
- New demands/expectations from ratepayers
- New requirements placed on operations
- Tracking, M&V


Local Government

# Role of Federal, State and Local Government

# Utilities will see similar impacts

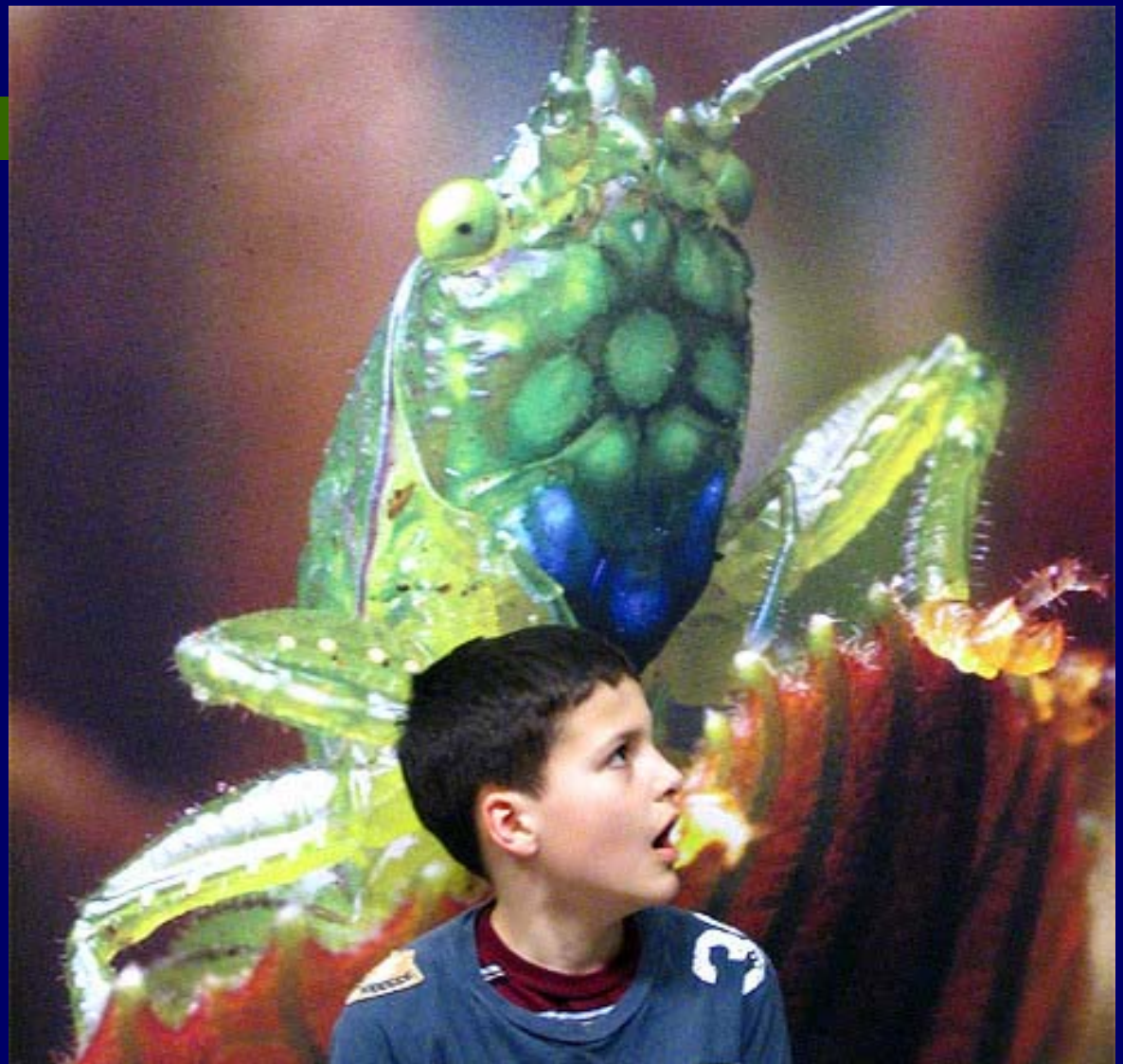
- Decisions at state and federal level may effect many aspects of operations
- Demand for new programs and ratepayer incentives (EmPower Maryland)
- Efficiency under the microscope
- Need to learn new methods of tracking, reporting, M&V
- Regulation of Carbon Credit and REC markets

# Environmental Issues

# Homeland Security

# The Economy

# Climate Change



# Regional Greenhouse Gas Initiative (RGGI)

- Cap & Trade (electricity sector)
- Allowances distributed via auction (mostly)
- Generators must meet cap via
  - Reducing emissions
  - Buying allowances
  - Approved offsets up to (3.3%)
    - Landfill methane capture and destruction
    - Reduction in emissions of sulfur hexafluoride (SF6) in the electric power sector
    - Sequestration of carbon due to afforestation
    - Reduction or avoidance of CO2 emissions from natural gas, oil, or propane end-use combustion due to end-use energy efficiency in the building sector
    - Avoided methane emissions from agricultural manure management operations

# RGGI States

# Strategic Energy Investment Fund

| Split | % | Agency | Purpose |
|---|---|---|---|
| 40% | 17 | DHR | Electric Universal Service |
| | 23 | PSC | residential rate relief |
| 60% | 23 | MEA | low income no-cost programs |
| | 10.5 | MEA | education, climate change, RE |
| | 26.5 | MEA | other stuff |

# Part 2

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# Targets for Reducing Greenhouse Gas (GHG) Emissions

- Coupled with the Development of Climate Action Plans for Achieving the Reductions
- State of Maryland, Montgomery County & Prince George's County GHG emissions reduction targets (baseline 2005-2006):
  - Cap emissions levels by 2010
  - Reduce emissions by 10% every 5 years through 2050
- MD Reduction Targets:
  - 10% below 2006 levels by 2012
  - 25% below 2006 levels by 2020
  - 90% below 2006 levels by 2050

# Developing a Verifiable Inventory

**GHG Inventory Elements**

- **GHGs**
  - CO2
  - CH4 (Methane)
  - SF6
  - N2O
  - PFC's
  - HFC's
  - Carbon Sequester
- **Sources (Examples)**
  - Stationary Combustion
  - Mobile Combustion
  - Refrigeration
  - Anaerobic Digestion
  - Landfill Gas
  - Energy Purchase
- **Boundaries**
  - Organizational
  - Operational
  - De Minimis
  - Base Year
- **Qualification**
  - Measurement
  - Calculation
  - Emission Factors
  - Data Quality
  - Collection Methods, Audits

# Emission Sources

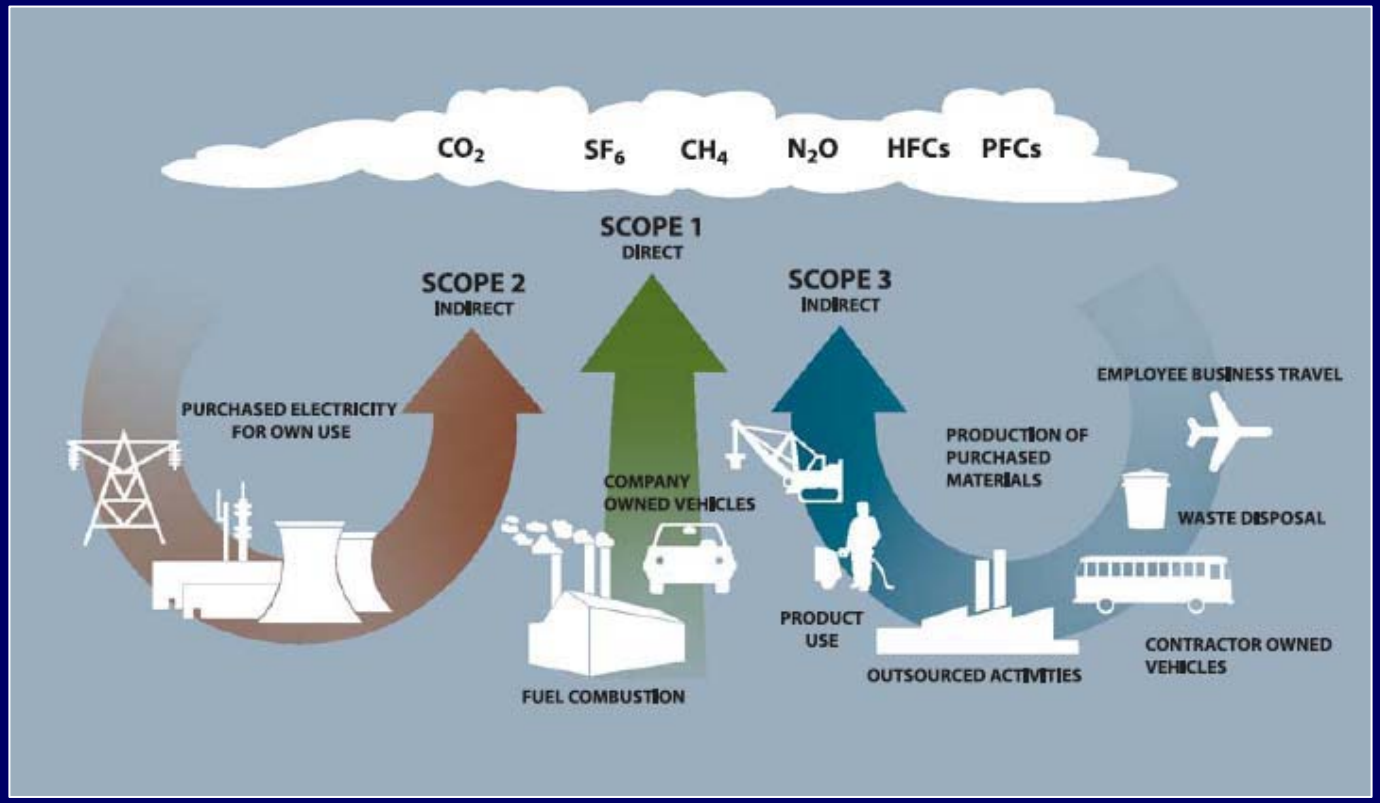
Direct: Stationary/Mobile Combustion, Process

- Heaters/boilers/incinerators
- Vehicles/transportation
- Wastewater treatment and collection
- Water treatment
- Refrigerants (fugitive)

Indirect: *Purchased* Electricity/Steam/Hot &Chilled $H_2O$

- Other Indirects: waste disposal, product use, recycling
- Contracted biosolids hauling and disposal
- Employee commuting

# What This May Look Like




Source: WRI/WBCSD GHG Protocol with modifications

# Greenhouse Gas Reduction Strategies

# Examples of GHG Emissions Reductions

- Renewable energy purchase/generation
- Energy management/efficiency efforts
- Demand side management by electric utilities
- Green Buildings
- Carpooling/Vanpooling
- Telecommuting
- Afforestation

# Greenhouse Gas Reductions-Specific Projects

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# Renewable Power- 10 years, 33%


| Environmental Benefits (over 10 Years) | |
|---|---|
| $CO_2$ Reduction | 83,700,000 lb/yr |
| $SO_2$ Reduction | 583,000 lb/yr |
| NOx Reduction | 188,000 lb/yr |

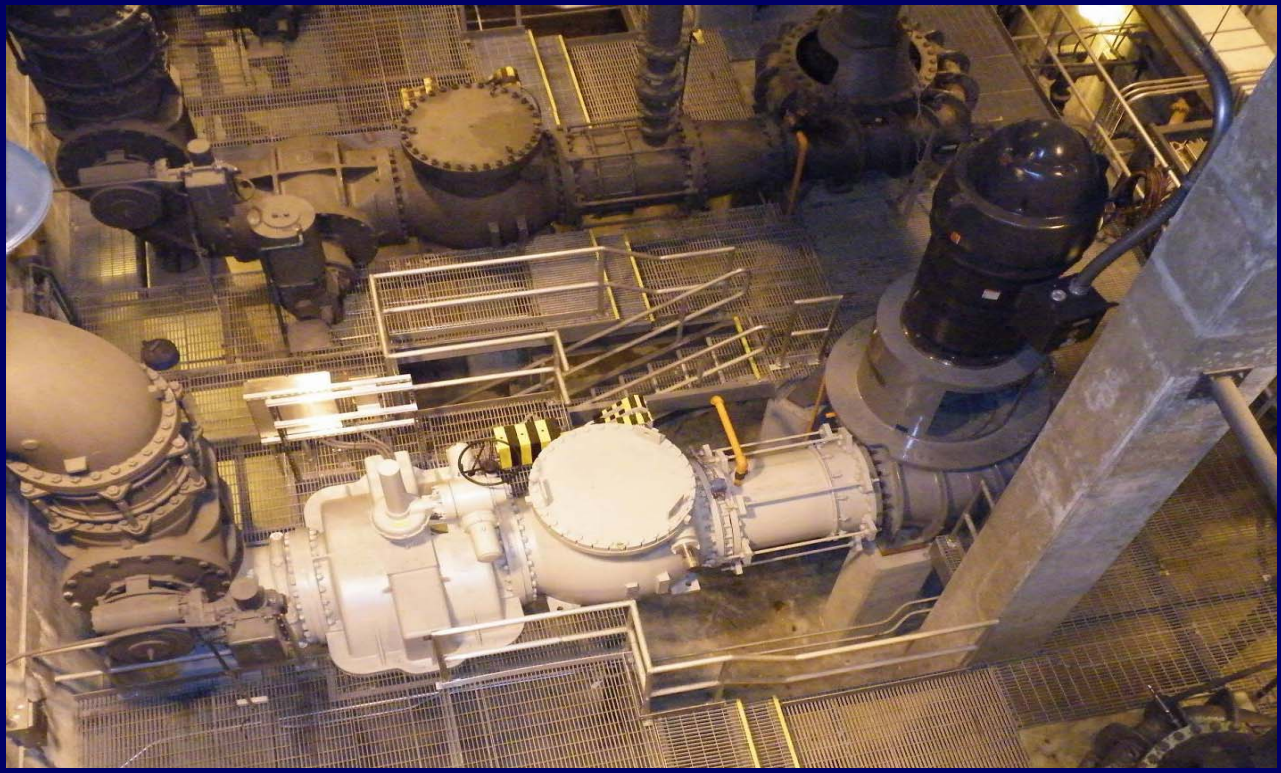
# Phase IIB Energy Performance Project

## - Currently under Construction

| Site | Scope | Capital Cost | Est. $ Savings per Yr. | Est. Units Saved per Yr. | Units |
|---|---|---|---|---|---|
| **Anacostia 2 WWPS** | **New Pumps Sized for Average Dry Weather Flow** | **$1,974,000** | **$415,000** | **3,775,000** | **kWh** |
| **Western Branch WWTP** | **Incinerator Upgrades** | **$5,663,000** | **$450,000** | **300,000** | **therms** |
| Seneca WWTP | Engine-Generator for Backup, Peak Shaving | $2,353,000 | $117,000 | N/A | |
| | | $ 9,990,000 | $ 982,000 | | |

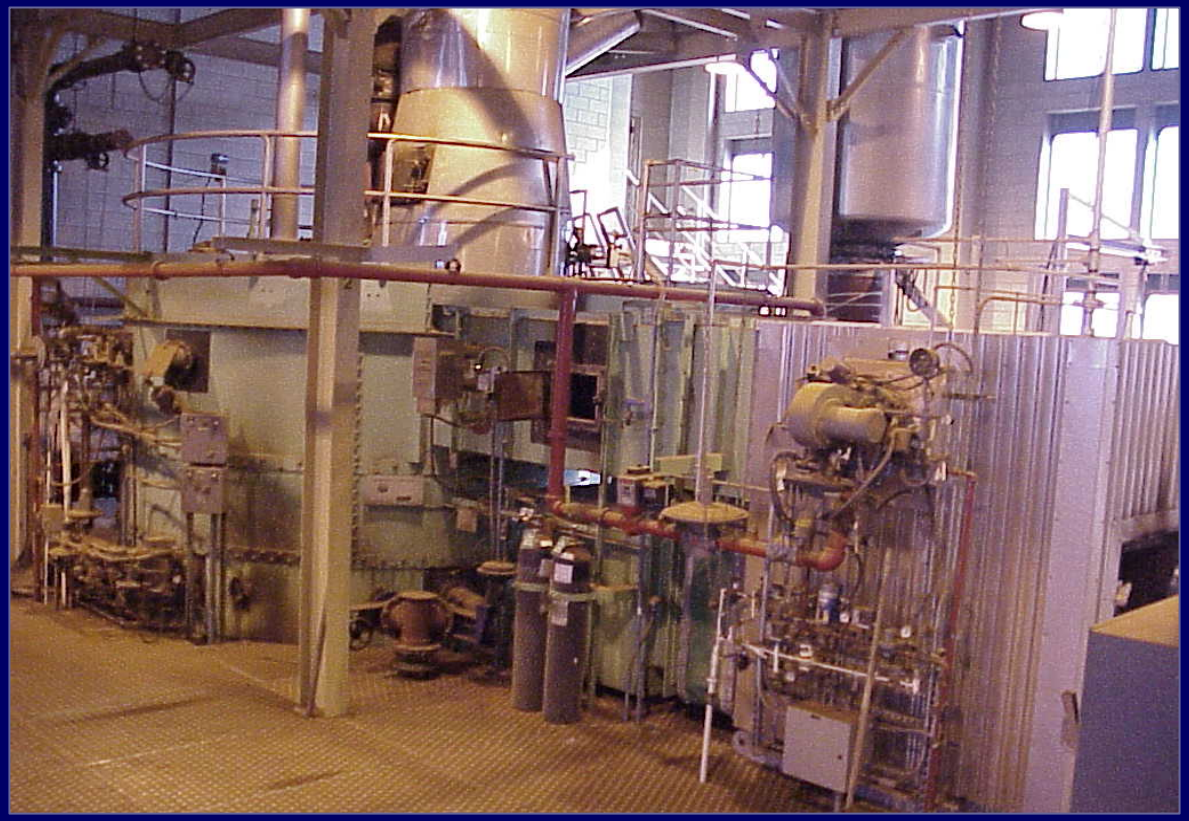
# WSSC Anacostia II WWPS – Typical Existing Pumps

# Anacostia II WWPS - New System

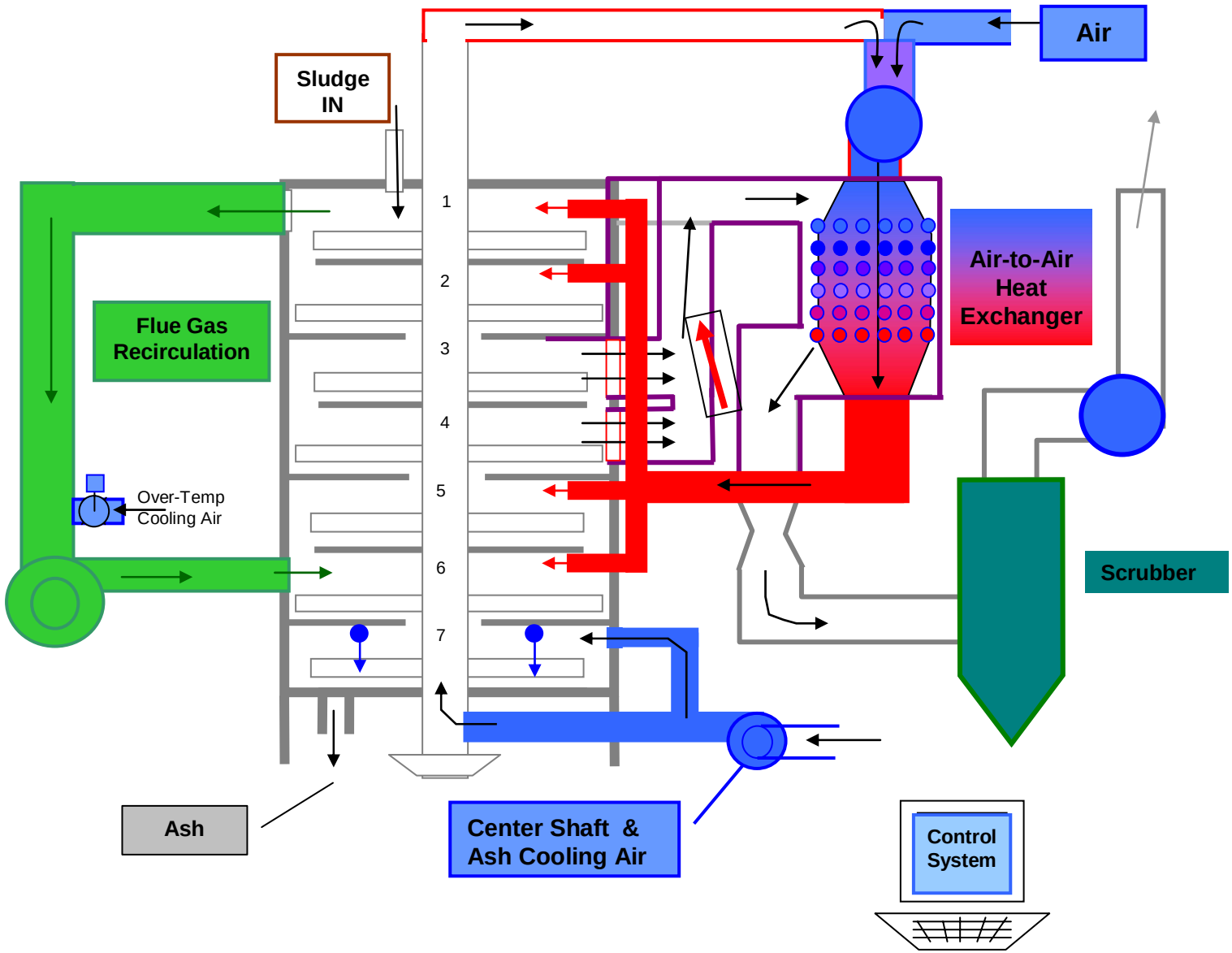


# New System - VFD controls

# Western Branch WWTP- Existing Incinerator w/Afterburner



# Western Branch Incinerator- Phase IIB Upgrades



# New Renewable Projects

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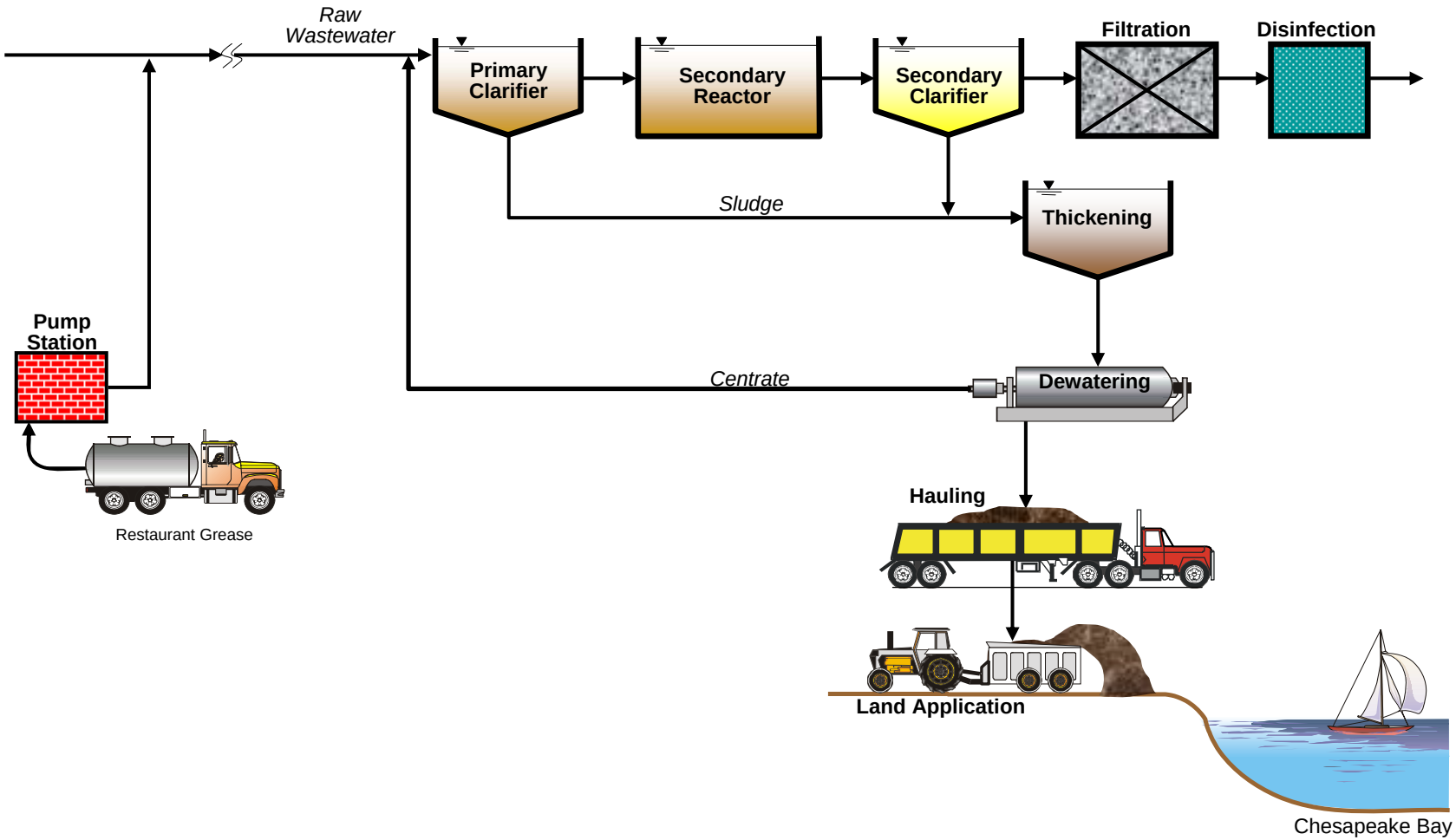
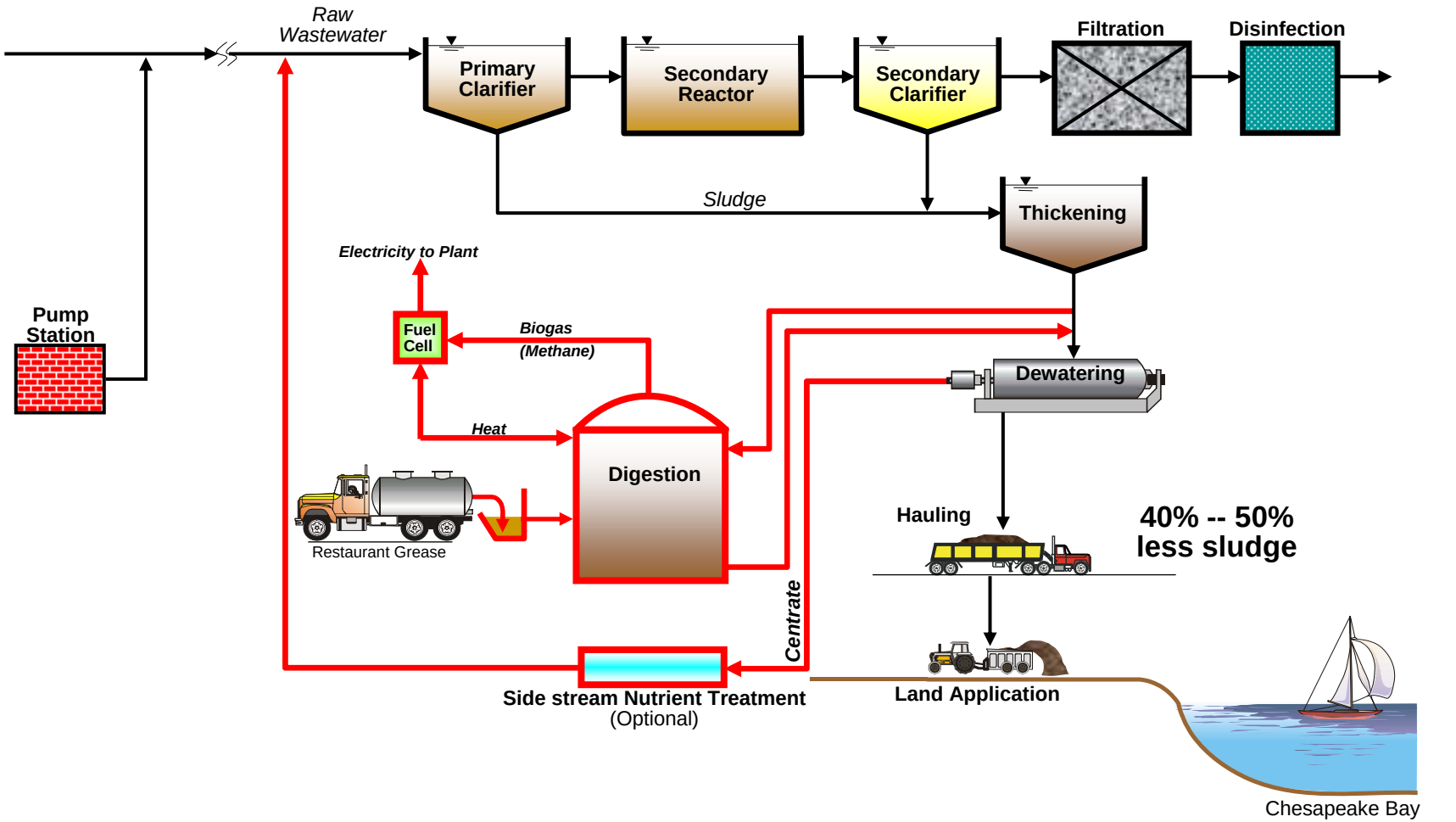
# Anaerobic Digestion/CHP

- Add Anaerobic Digesters and Combined Heat & Power (CHP) to two existing 30 MGD wastewater treatment plants.
- Add restaurant grease trap waste to digesters to improve digester performance and alleviate sewer blockages.
- Estimated capital cost for two plants: $25-$30 million.
- Estimated annual savings $2-$3 million (two plants) including electricity, sludge hauling, GHG reductions/credits.

# Wastewater Treatment Plant without Anaerobic Digestion



# Wastewater Treatment Plant Modified for Anaerobic Digestion & Combined Heat & Power Generation




Existing
Proposed

# QUESTIONS?