

**Fueling the Next Level of Energy Management**  
**Steve Davis**  
**Columbus Water Works**  
**October 22, 2012**

# Overview of Columbus Water Works System

## Columbus Region



- 66,000 Water Accounts
- 60,000 Sewer Accounts
- 2 – Water Treatment Plants (90MGD/8MGD)
- 1 – Wastewater Treatment Plant (42 MGD)
- 2 – CSO Treatment Facilities
- 1350 Miles of Water Lines
- 1100 Miles of Sewer Lines
- 50 Year Contract w/Ft. Benning to own and operate water and sewer systems



## **CWW Energy Management Activities Over Past 15-20 years:**

- **Bi-Monthly Meter Reading**
- **Energy Audits**
- **Vehicle Anti-Idling Policy**
- **GPS Vehicle Tracking**
- **SCADA System Development**
- **On-Site Power Generation**
- **Rate Agreements With Electric Power Provider**
- **Utilization of Electrical Energy Consultant**

# Bi-Monthly Meter Reading Benefits



- Saves fuel
- Reduces emissions
- Reduces manpower
- Saves approximately 11,100 gallons of fuel per year.

# Energy Audit



Facilities evaluated for energy efficiency

Improvements:

- ✓ During the audit, it was noted that CWW could benefit from using more efficient lighting and HVAC products.
- ✓ CWW has incorporated many of the suggested changes.

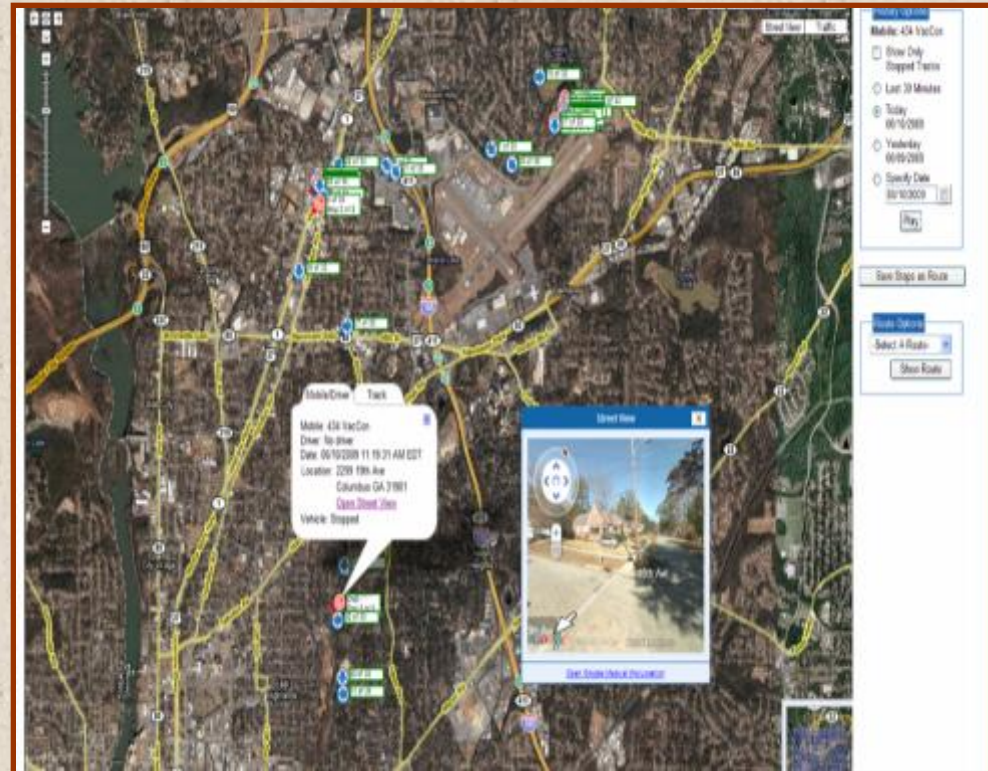
# Anti-Idling Policy



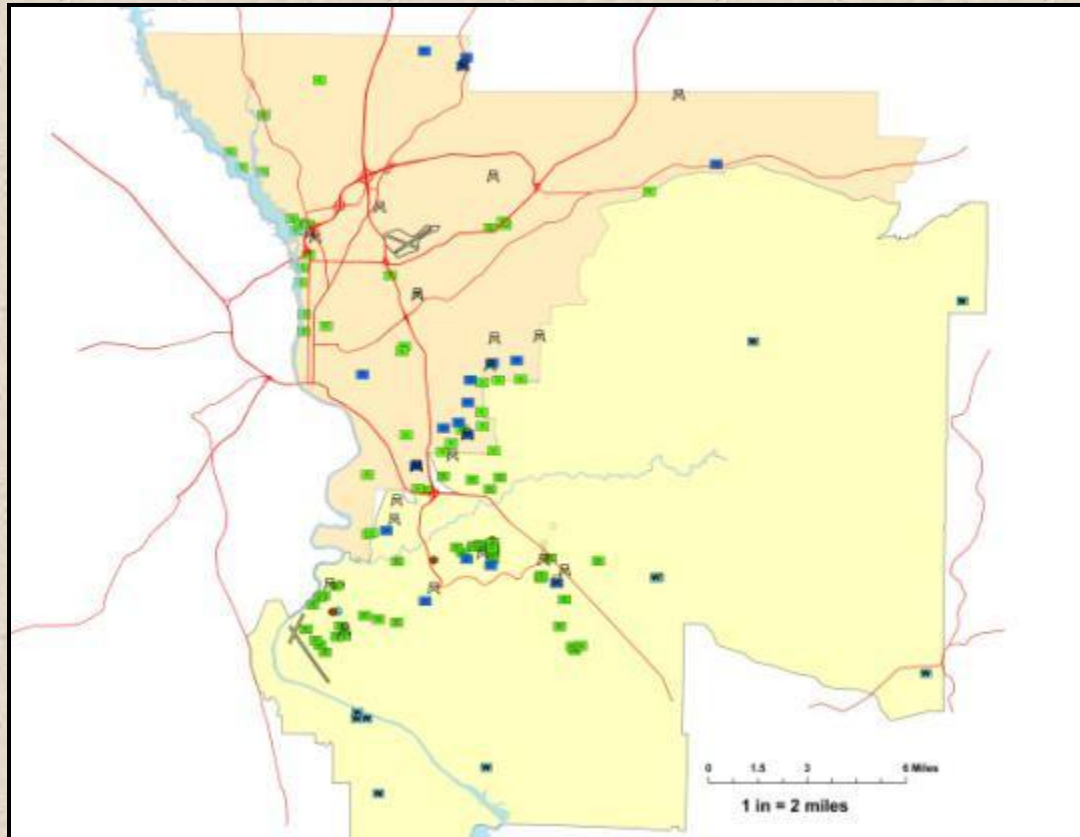
- Requirements:
  - Maximum idle time is 5 minutes
- Benefits:
  - Fuel Savings
  - Emissions reduction

# Automatic Vehicle Locater (AVL)

- System provides:
  - Real time tracking of vehicles
  - Historical location/time of vehicles
  - Route with time stamp per vehicle
  - Customizable reports
  - Real time e-mail alerts
- Benefits:
  - Reduction in fuel emissions
  - Increased productivity
  - Fuel savings
  - Daily routing improvements
  - Decreased idle time
  - Work order verification: arrival/departure
  - Validation of service calls
  - Has been used to defend against speeding tickets



# SCADA



Real Time status of distributed facilities, tanks, booster stations, wastewater pumping stations, wells

- Saves fuel/emissions
- Increased responsiveness
- Allows better control of pumping/electrical load management
- Recent SCADA upgrade at Ft. Benning saved 75,000 to 100,000 miles/year on service truck

# On Site Power Generator

- Two 1.75 Megawatt methane/natural gas powered generators at SCWRF
- Four 600 Kilowatt diesel powered generators at NCWRF
- Benefits
  - Reduces exposure to outages
  - Allows for “real-time pricing” savings
  - Cleaner energy than off-site coal fire power generation



# Cogeneration Savings and Maintenance Cost Does Not include Capital for Minor & Major Overhaul Cost



# Off-Peak Rider

- 
- Peak power usage sets rates for the remainder of the year
  - Plant SCADA System is programmed with focus on power
  - CWW utilizes Georgia Power Companies power and light large rate, which allows for higher “off peak” demand. GA Power Company peak demand is 7 am to 7 pm.  
Power and off-peak rider, which shortens “peak demand” to 10 am to 6 pm.

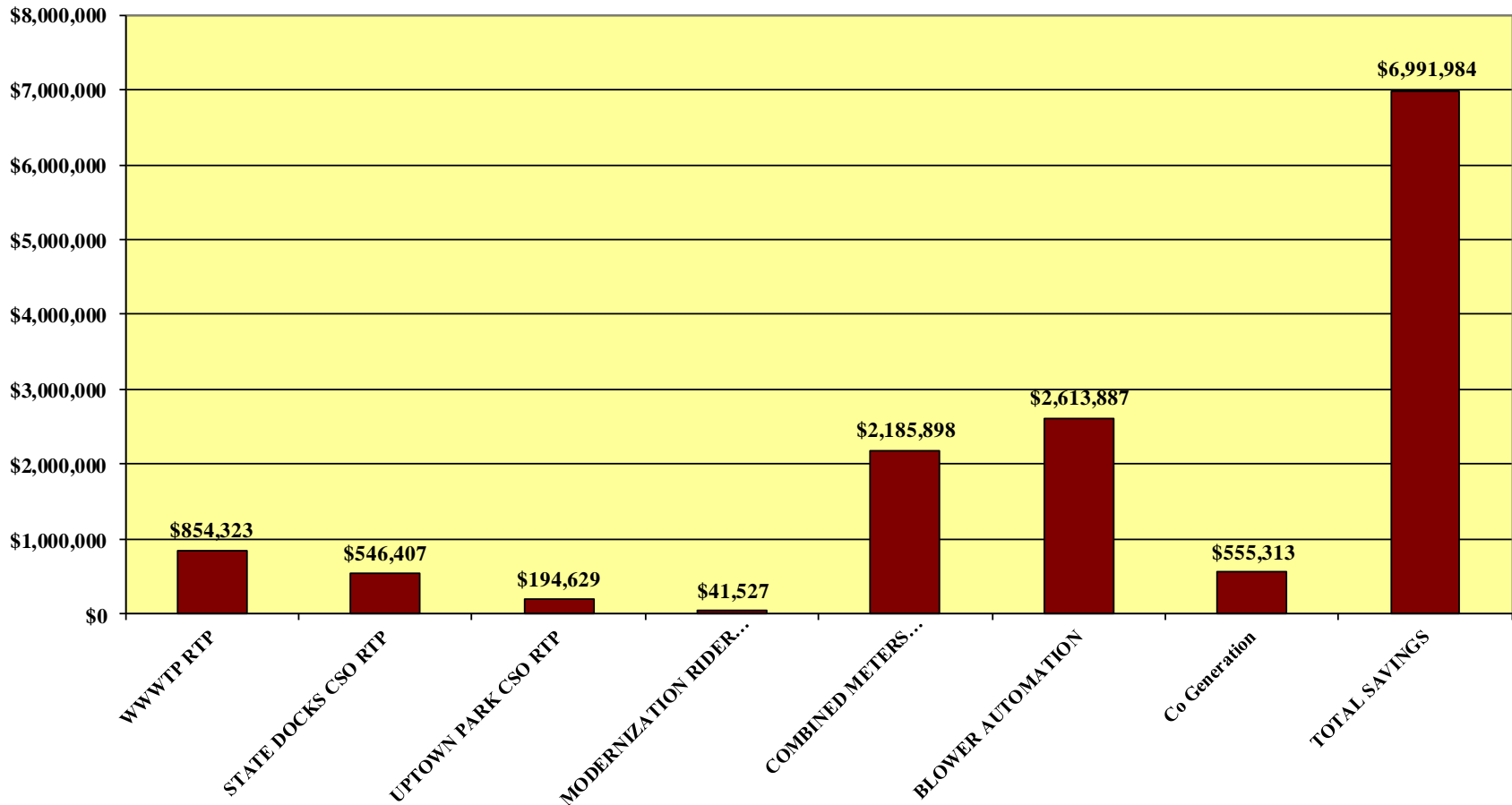
# Rate Alternative – Efforts Used to Date

- Combined water plant and river pump station meters
- Use of “Modernization Rider” at water plant with the standard Power & Light Large (PLL) rate
- Use of “Off-Peak Rider” with PLL rate at water plant
- Use of “Real Time Pricing” rate at wastewater plant
- Use of “Real Time Pricing” at two Combined Sewer Overflow Facilities
- Currently anticipating the use of a Multiple Load Management energy rate and put WTP on RTP pricing to increase further rate savings
- Looked at DPEC Rider – Interruptible Rider, but not willing to take the gamble



# TOTAL SAVINGS REALIZED TO DATE

SAVINGS REALIZED FROM ENERGY REDUCTION EFFORTS 1995-2012



## **CWW Energy Management Activity Now...**

- **Selected consultant to provide new and broader perspective of energy management improvements.**
- **Challenged us to take a view from the future, backwards to chart a path to reach our future.**
- **Builds vision, possibilities, opportunities.**
- **Aligns core competencies and strategic planning along common path.**

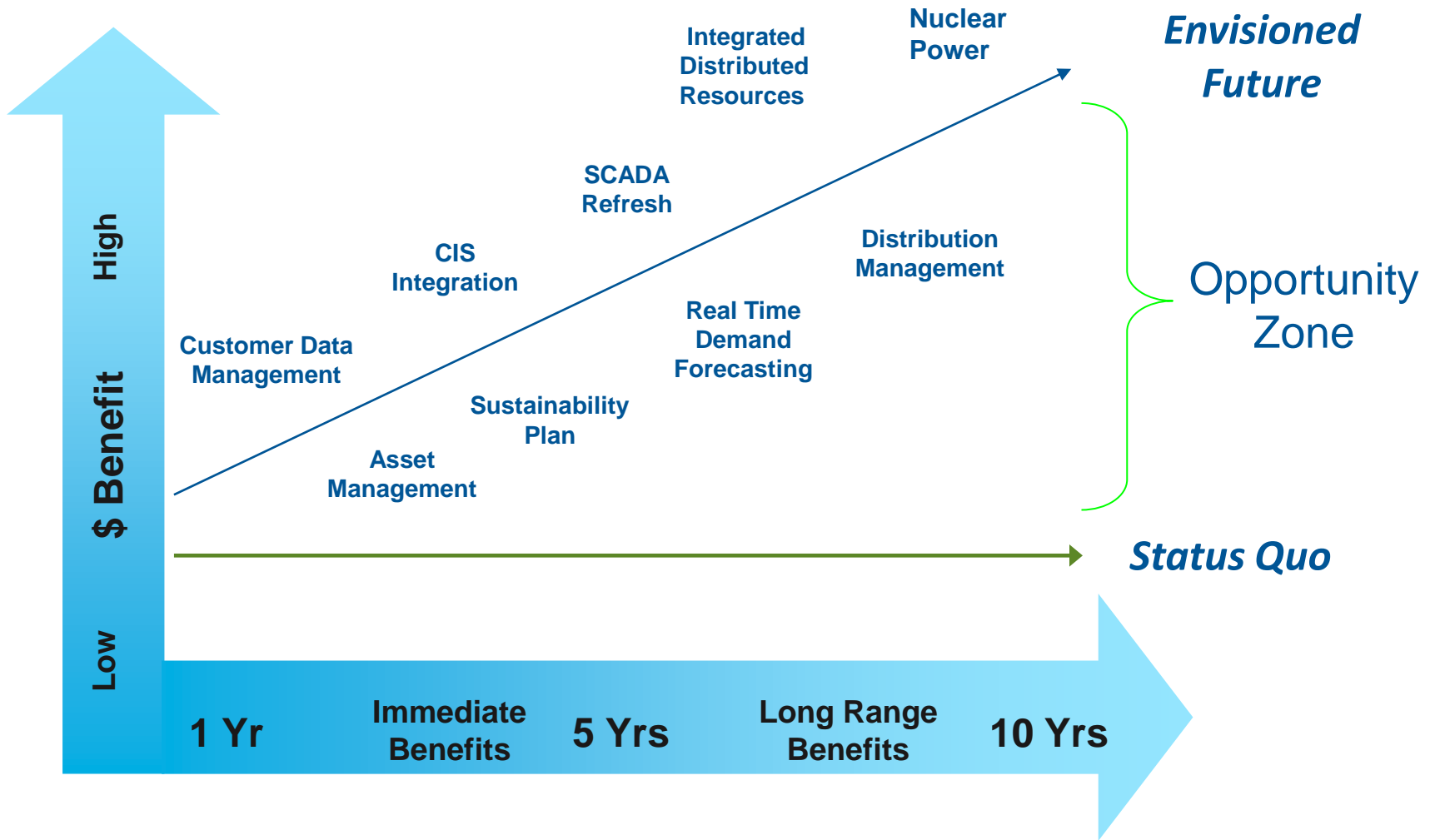


# ENERGY NOW AND INTO THE FUTURE



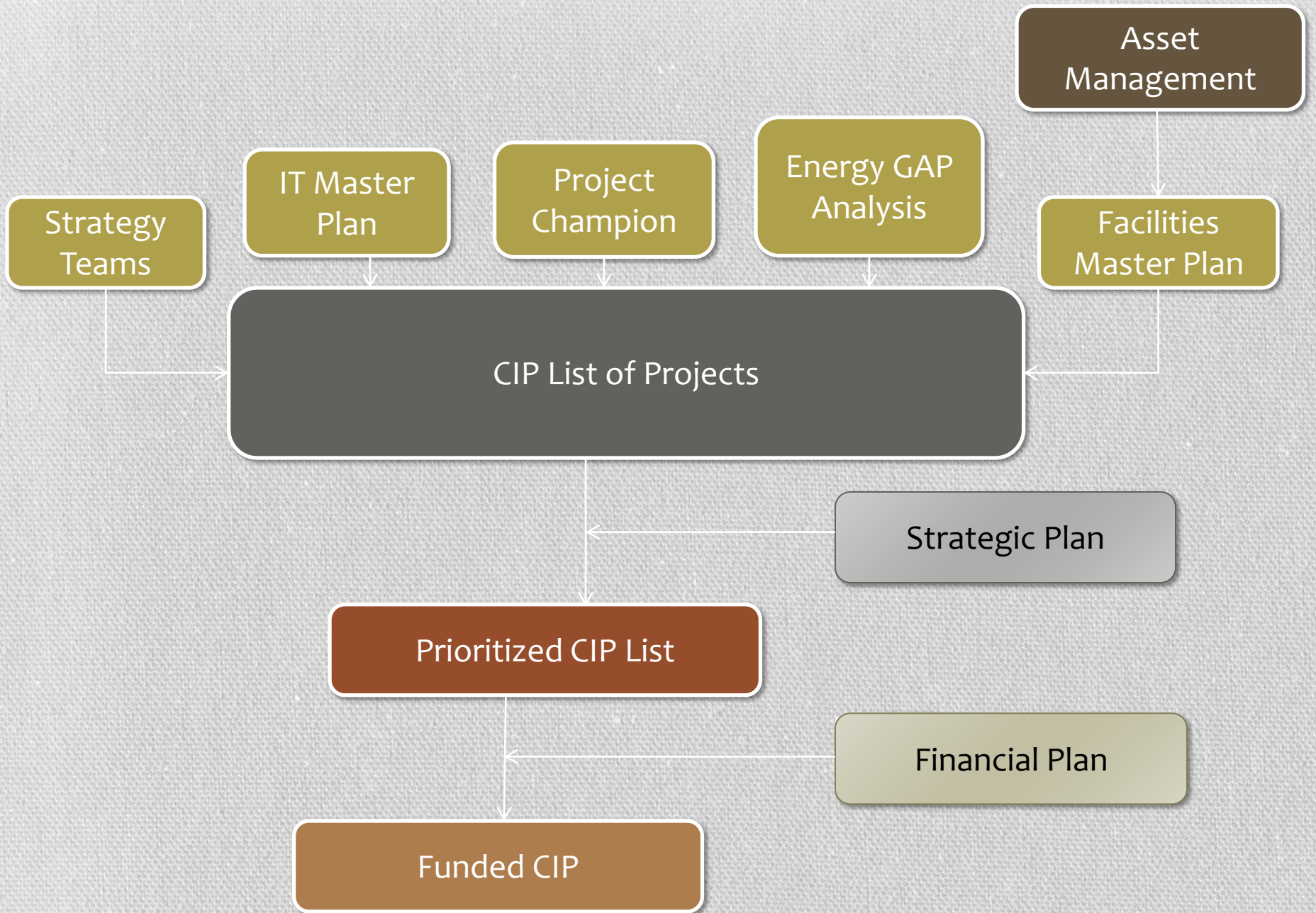
- **Energy management systems that are fully integrated into operating processes**
- **Direct utility connections for arbitrage**
- **Balanced between water and energy needs**
- **Full cycle view including chemicals**
- **Linked self-generation/renewables**
- **On-site nuclear power**

# DEVELOPING A ROADMAP

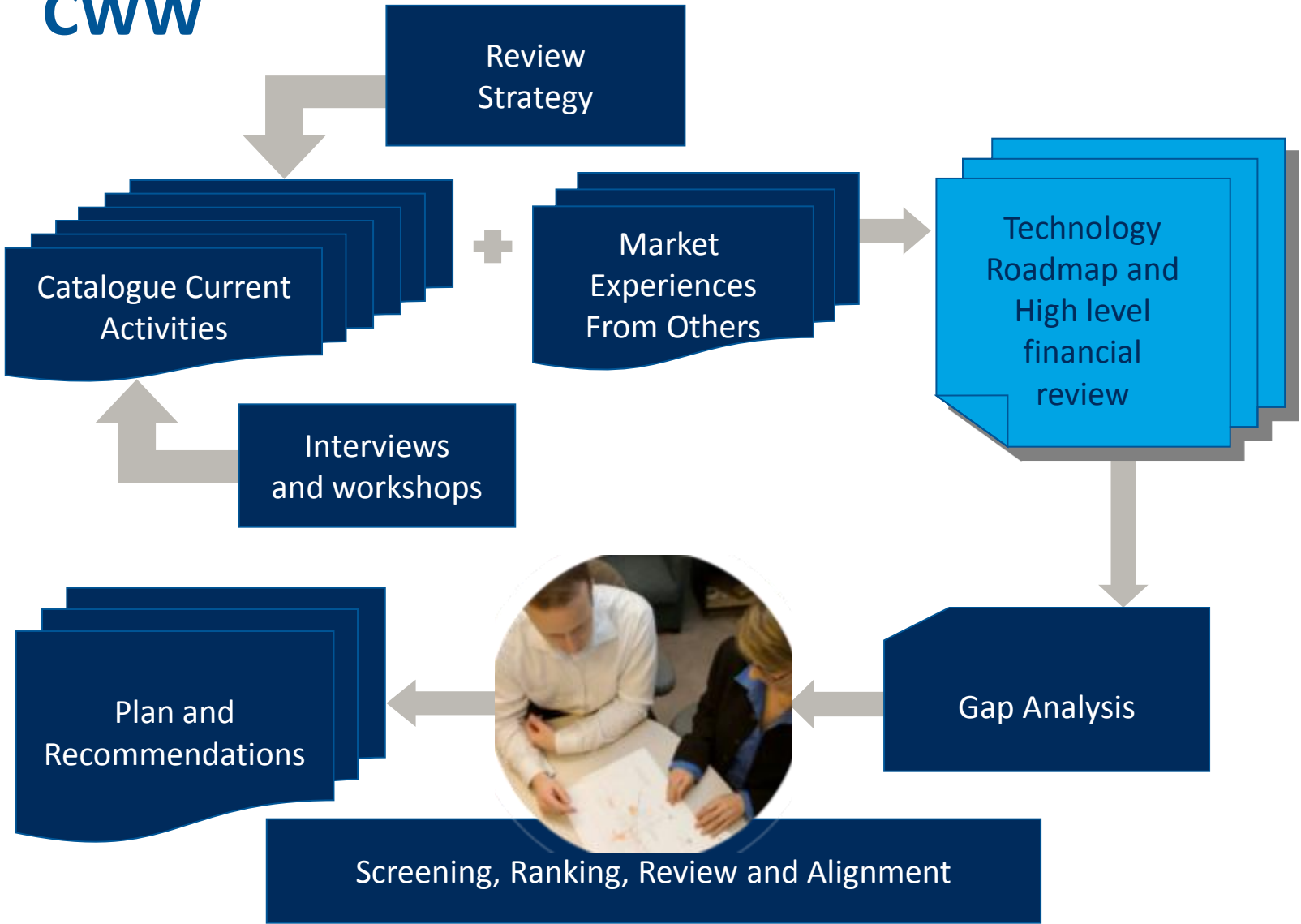


# ALIGNMENT WITH CWW'S STRATEGIC DIRECTIONS

- **Alignment with CWW's 6 Strategies**
  - Business Cases are evaluated on the alignment with CWW's individual Strategies and scored from 1 to 10
    - Enhance Customer Satisfaction
    - Strengthen Regional Potential
    - Leverage Information Technology
    - Optimize Infrastructure Performance
    - Develop Sustainable Workforce
  - The aggregate score from the 6 Strategies is bracketed into "Low", "Medium", or "High" Strategic Alignment



# ENERGY ROAD MAPPING APPROACH FOR CWW



# DEVELOPING ROADMAP DESTINATIONS

## 1. Strive for the Energy Drive (2013 – 2014)

Focus on embedding the concept of energy management into the culture of the organization. The metrics developed will encourage employees to apply and support energy efficient technologies, operating approaches and investments as well as track the financial returns and balance this against level of service.

## 2. Fuel Strategy (2015 – 2016)

The objective is to build a strategy from a mixture of different but tested fuels to provide a balanced portfolio of fuel sources will help CWW to manage the risks of availability and variations in price

## 3. Green Energy Management (GEM) (2017 – 2018)

With a growing number of new policies and market regulations relating to environmental conservation, CWW employees will need to gain an understanding of the critical opportunities and limitations of the new policies. There will be components of learning involving spot market pricing, competitive and viable sources of fuel.

## 4. Efficiency Exhibition (2019 – 2020)

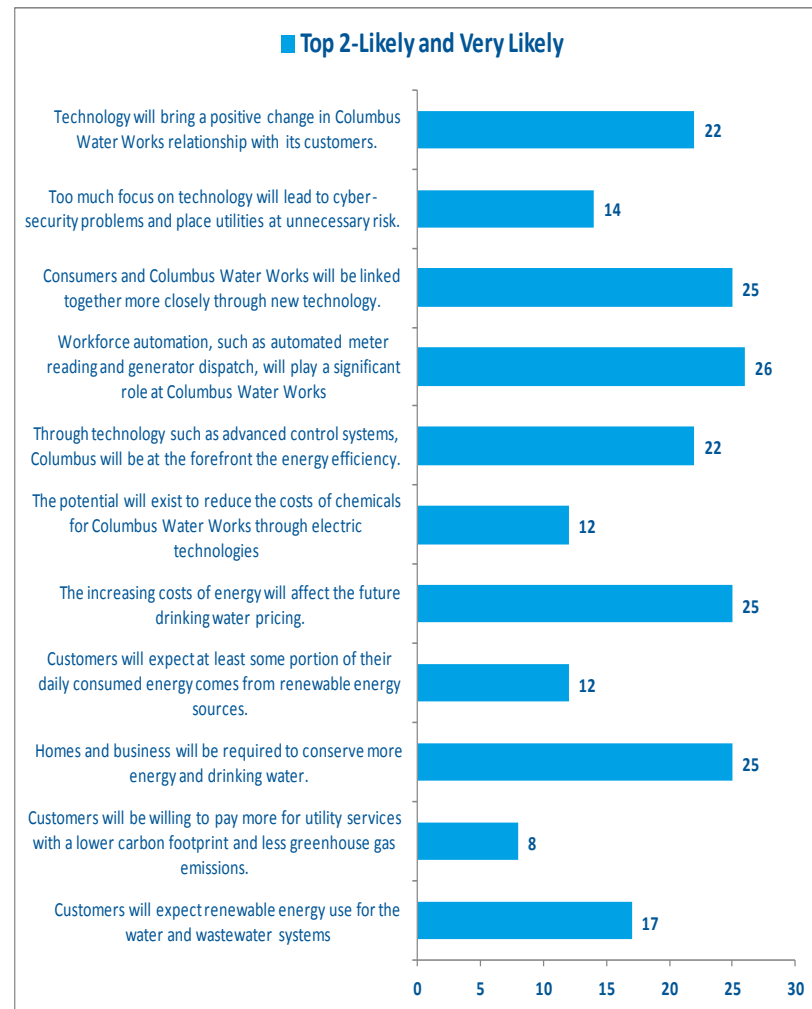
Implementing the emerging and proven technologies around water and energy usage will convert directly into reduced consumption, and improve efficiency

## 5. Water and Electricity Efficiency Network (2021 – 2022)

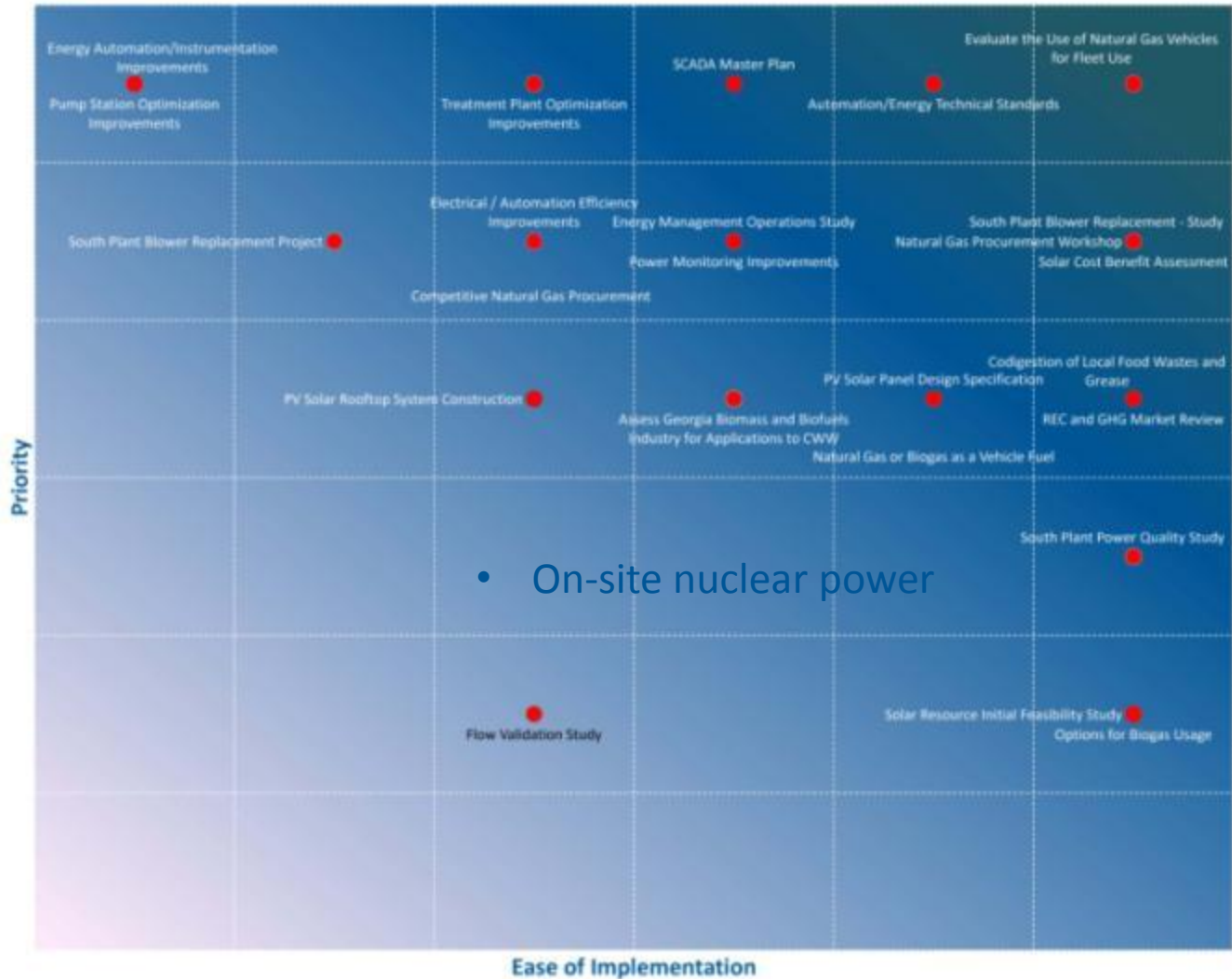
Benchmarks that were tracked can be reported and evaluated to aid in optimizing the water network. More tested technologies will be available that will promote enhanced operations. The SCADA network is unified between the generators, pumps, and along the distribution networks.

# STAFF ENGAGEMENT PROCESS

- 169 of the approximately 210 employees responded
- Significantly higher response rate than on other similar Black & Veatch surveys
- Pleased with this response as it signals the active engagement of the workforce
- Suggests that any change management program we recommend as part of the gap closure projects will be well received and successful.



# DRAFT CWW PROJECT PRIORITIZATION MATRIX



Initiative prioritization considers 'Priority' and 'Ease of Implementation' as illustrated above

# DRAFT CWW ENERGY ROADMAP

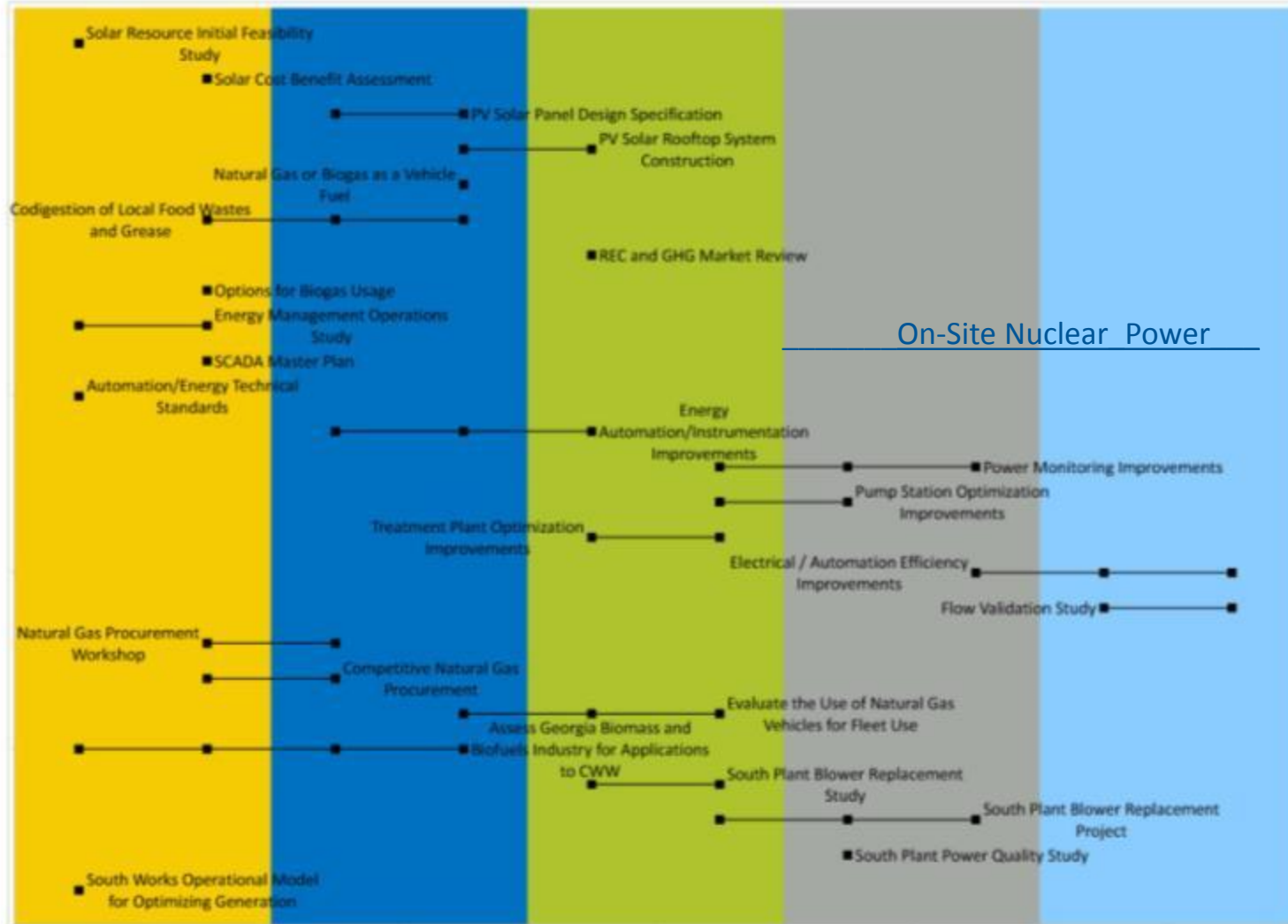
2014

2016

2018

2020

2022



Questions???

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