# Blue Plains Energy Projects

***Presented to:***

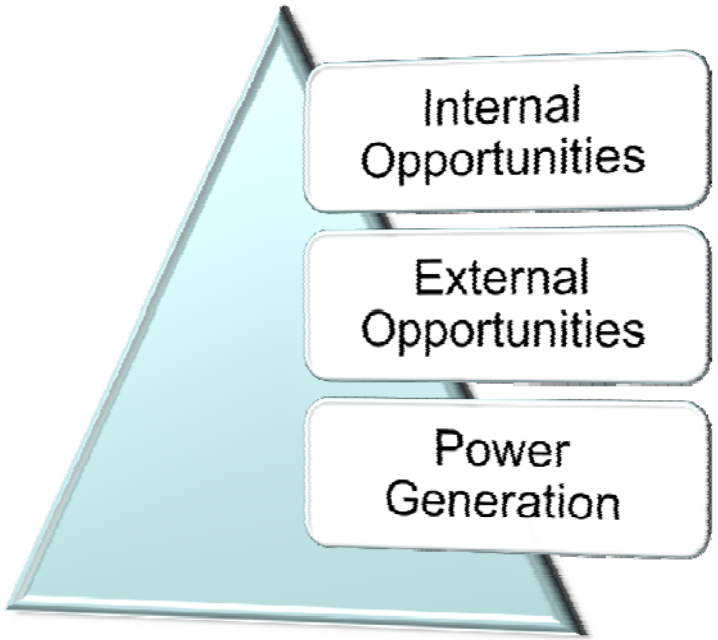
***COG Energy Advisory Committee***

***Salil Kharkar, P.E.***
***Director of Process /Engineering***
***DC Water – Blue Plains***

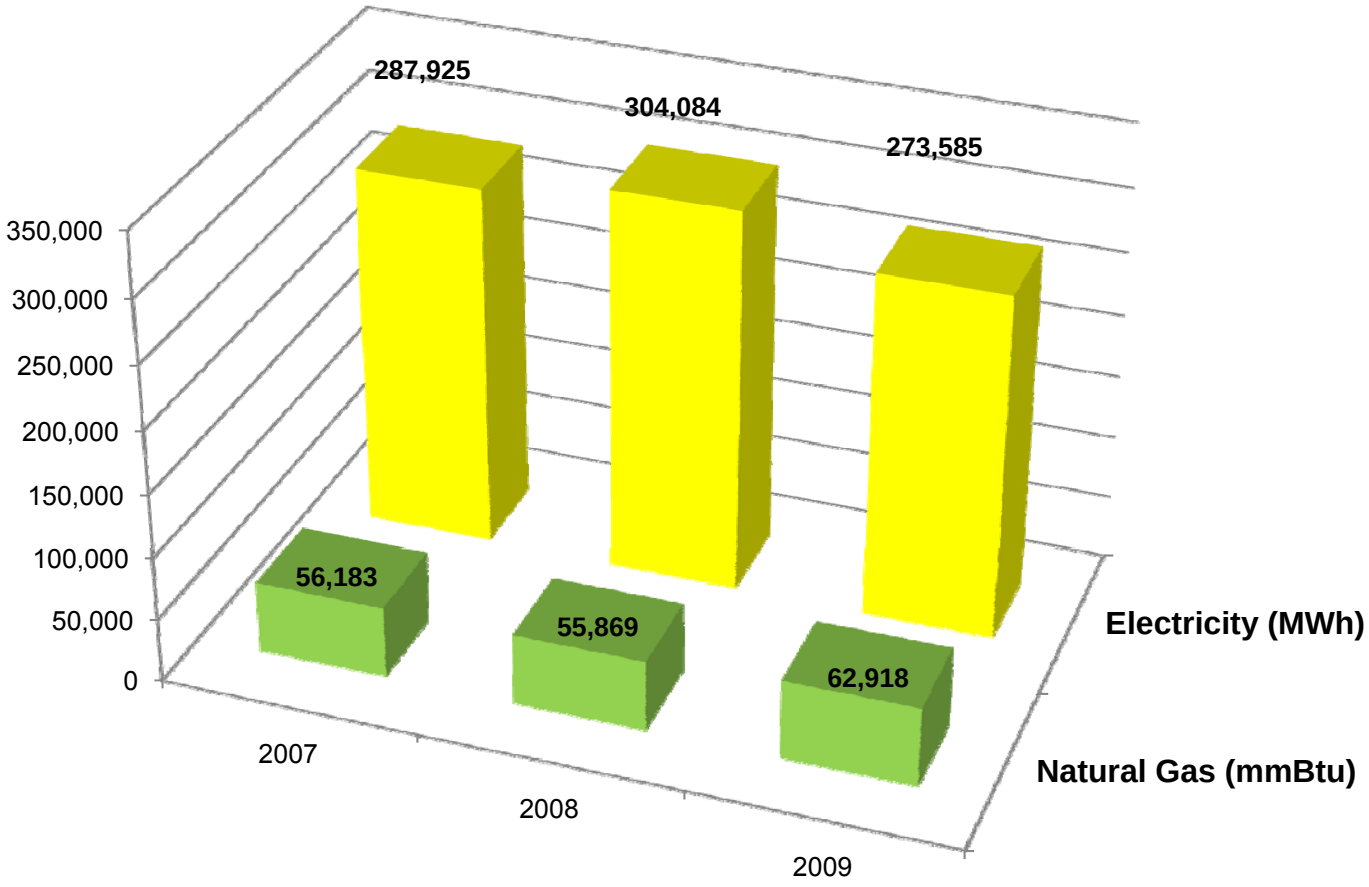
**November 15, 2012**

# Agenda

1. DC Water energy use at Blue Plains
2. Power Generation
3. Energy Saving Opportunities

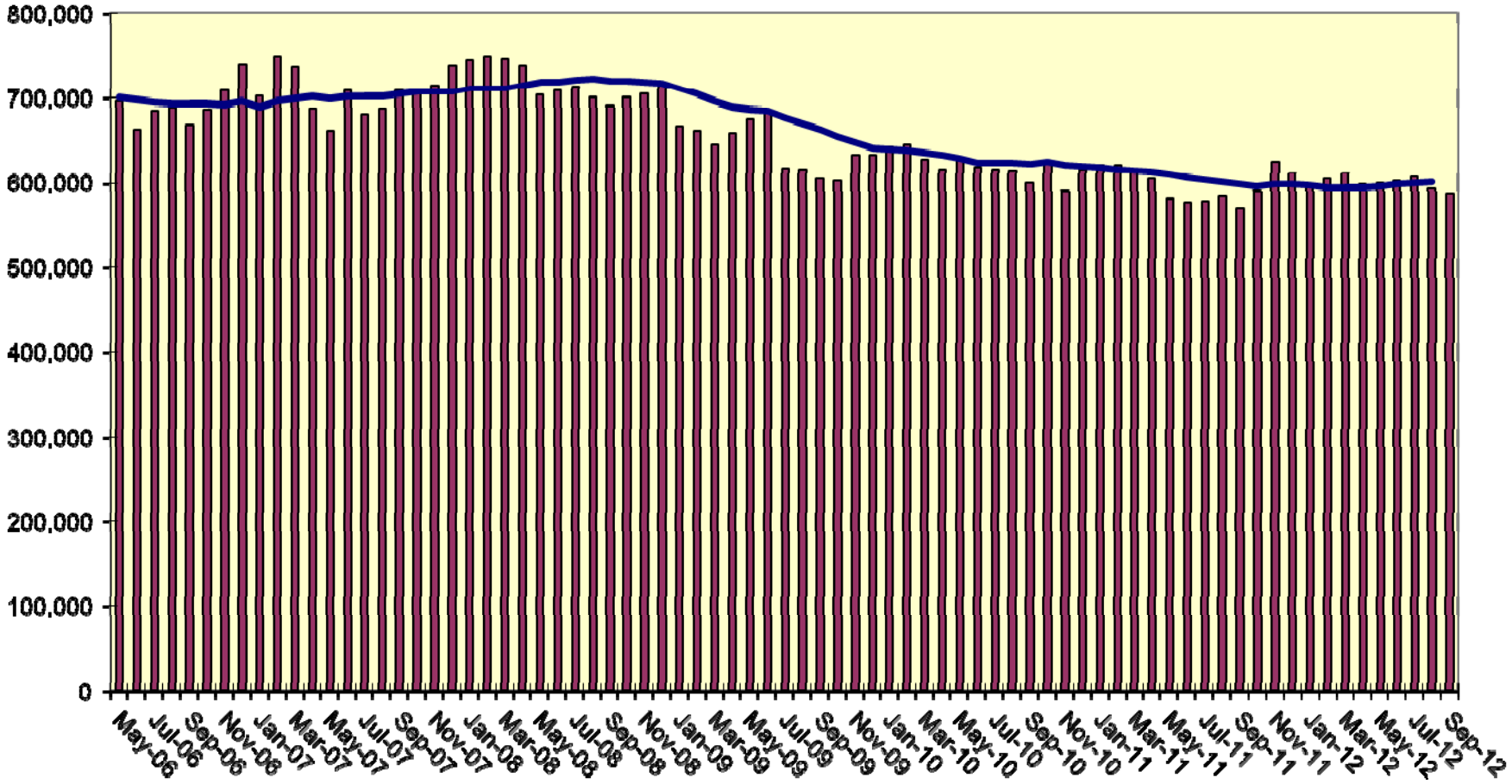


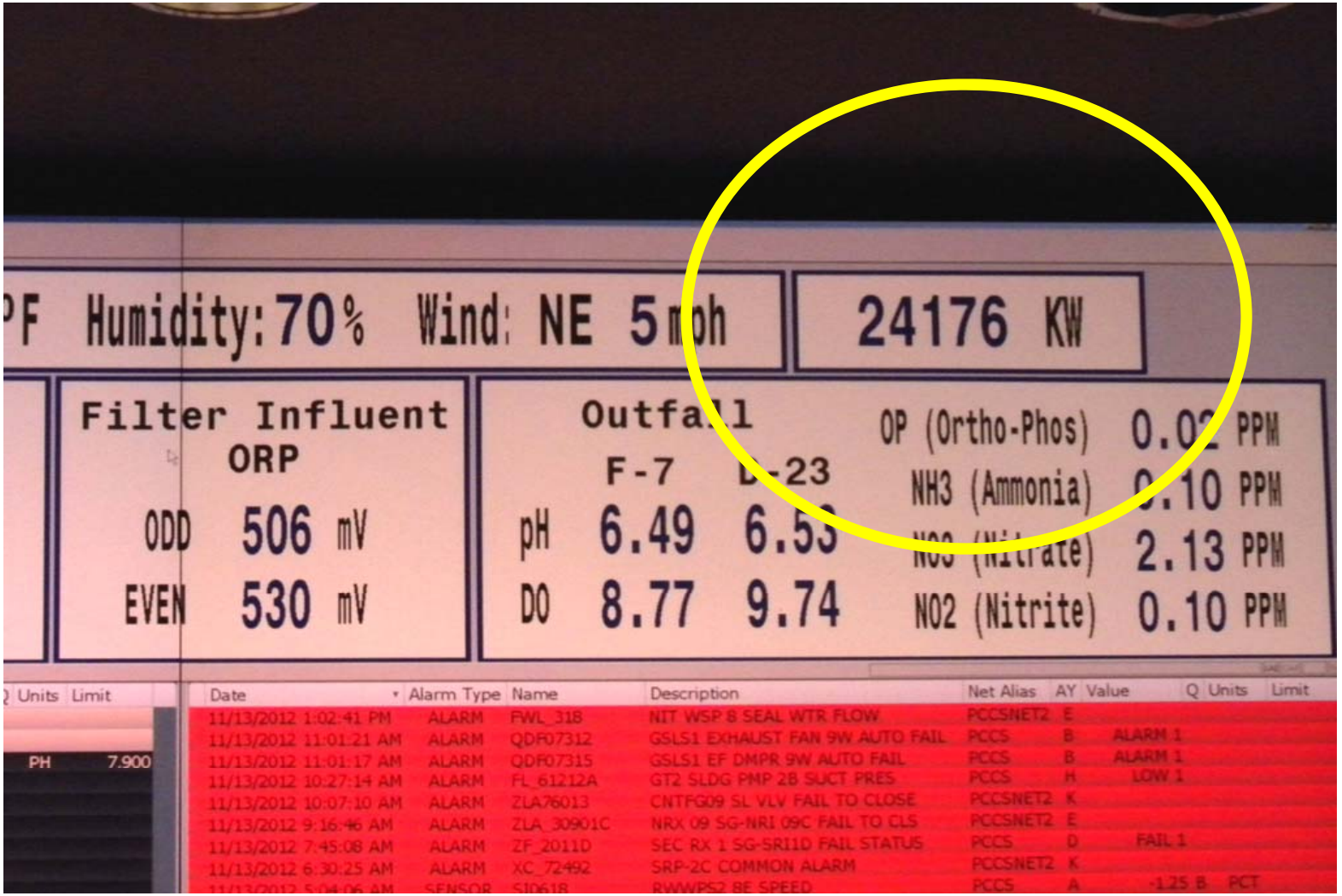
# DC WATER Energy Consumption




**Based on invoices**
**2009 electricity based on PEPCO metering data**

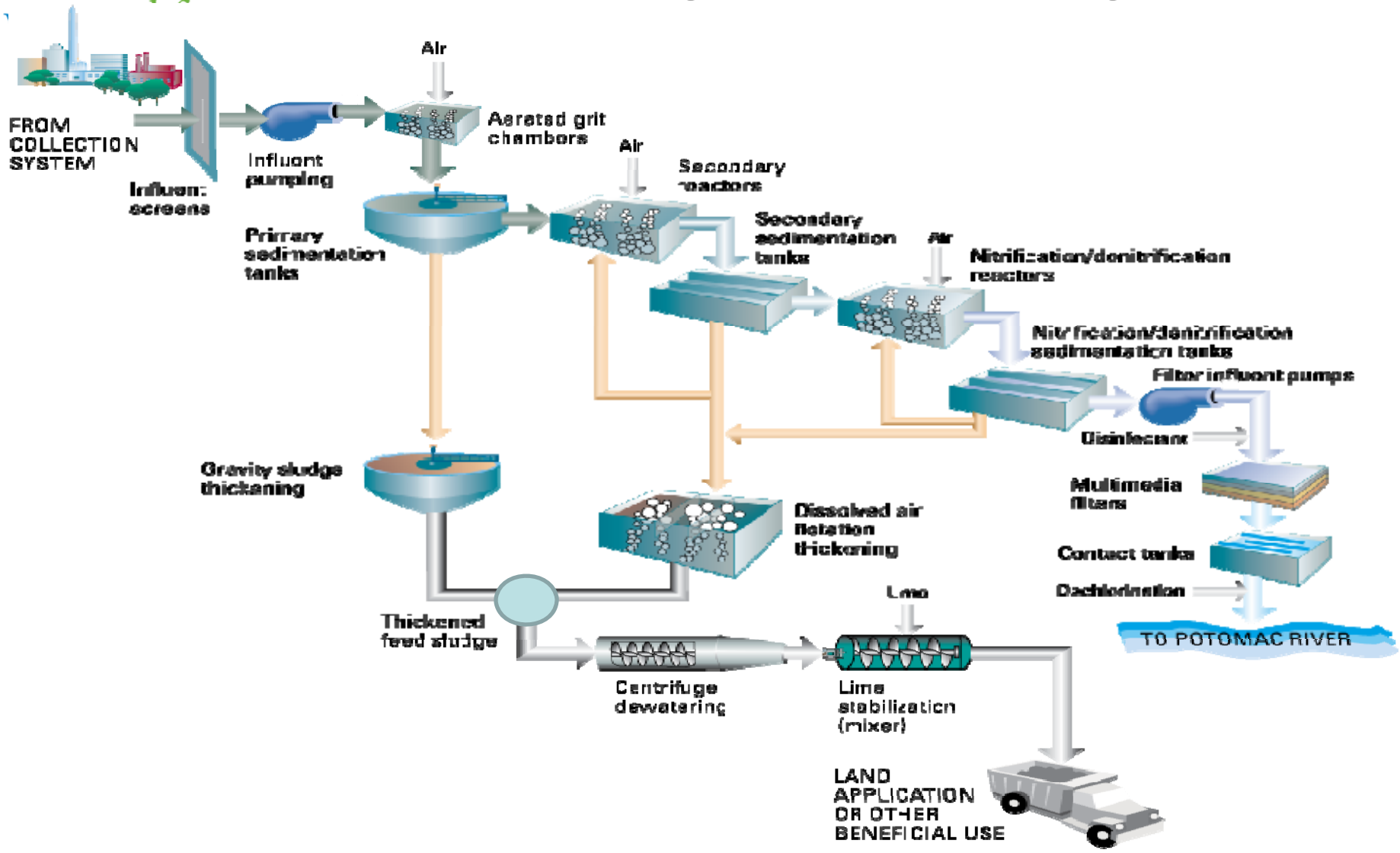
## Blue Plains
## Electricity Used, kwh/day



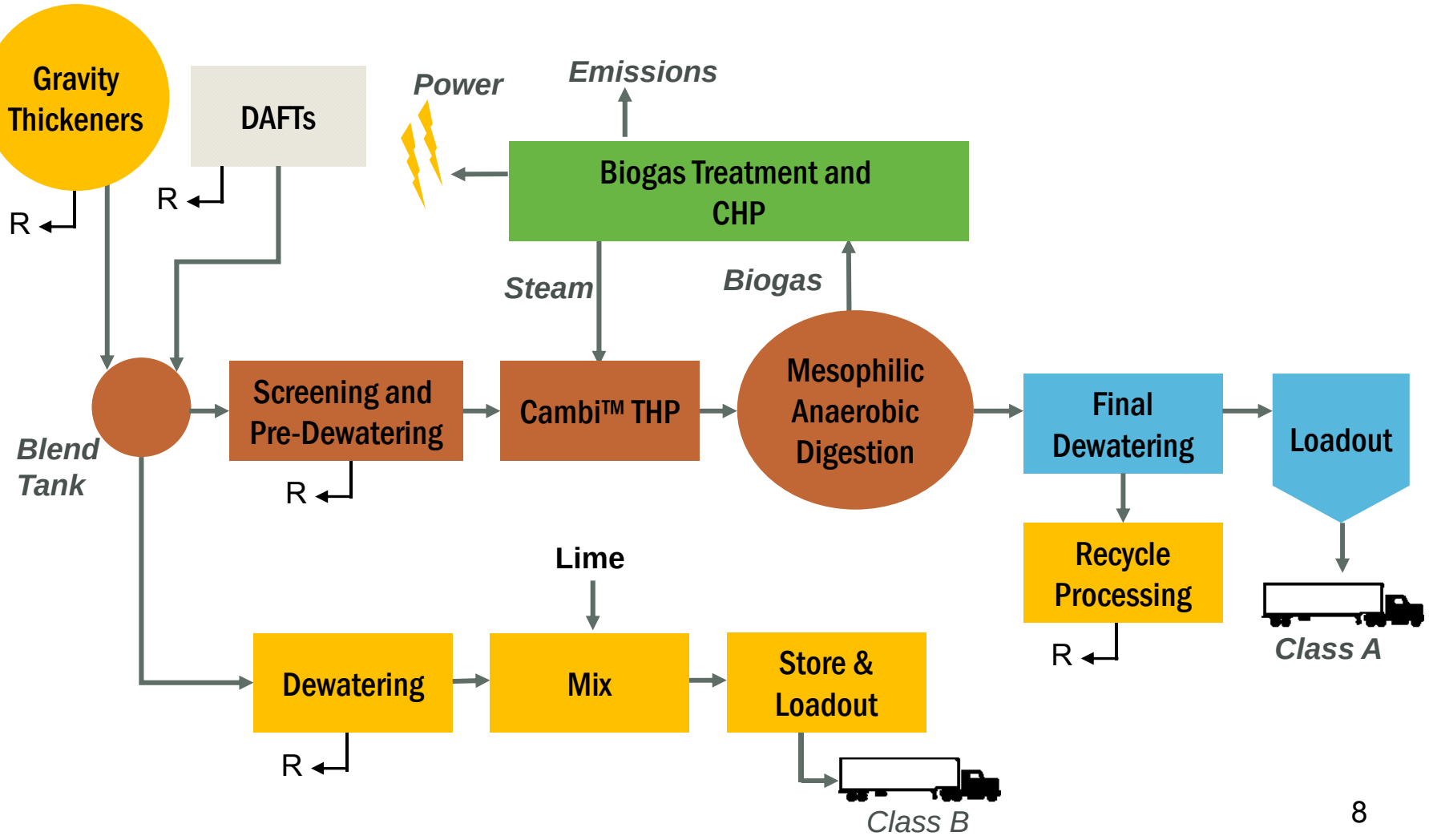

°F Humidity:70% Wind: NE 5mph
24176 KW
Filter Influent
ORP
ODD 506 mV
EVEN 530 mV
Outfall
F-7 D-23
pH 6.49 6.53
DO 8.77 9.74
OP (Ortho-Phos) 0.02 PPM
NH3 (Ammonia) 0.10 PPM
NO3 (Nitrate) 2.13 PPM
NO2 (Nitrite) 0.10 PPM
Units Limit
PH 7.900
Date Alarm Type Name Description Net Alias AY Value Q Units Limit
11/13/2012 1:02:41 PM ALARM FWL_318 NIT WSP B SEAL WTR FLOW PCCSNET2 E
11/13/2012 11:01:21 AM ALARM QDF07312 GSLS1 EXHAUST FAN 9W AUTO FAIL PCCS B ALARM 1
11/13/2012 11:01:17 AM ALARM QDF07315 GSLS1 EF DMPR 9W AUTO FAIL PCCS B ALARM 1
11/13/2012 10:27:14 AM ALARM FL_61212A GT2 SLDG PMP 2B SUCT PRES PCCS H LOW 1
11/13/2012 10:07:10 AM ALARM ZLA76013 CNTFG09 SL VLV FAIL TO CLOSE PCCSNET2 K
11/13/2012 9:16:46 AM ALARM ZLA_30901C NRX 09 SG-NR1 09C FAIL TO CLS PCCSNET2 E
11/13/2012 7:45:08 AM ALARM ZF_2011D SEC RX 1 SG-SR11D FAIL STATUS PCCS D FAIL 1
11/13/2012 6:30:25 AM ALARM XC_72492 SRP-2C COMMON ALARM PCCSNET2 K

# Blue Plains AWWTP

# Existing Flow Diagram



# Biosolids Layout



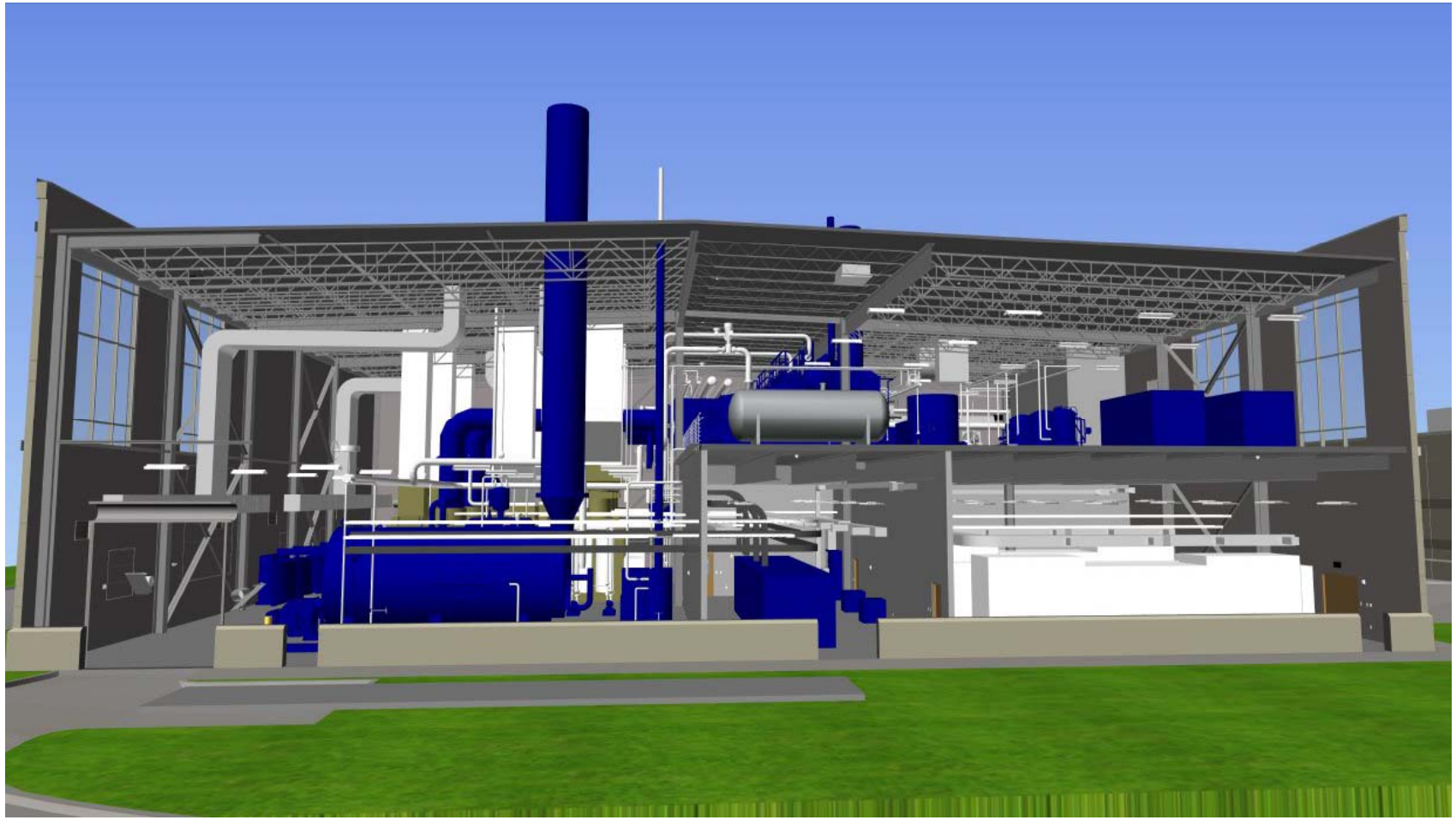
# Biosolids Project Site

# Digester Overview

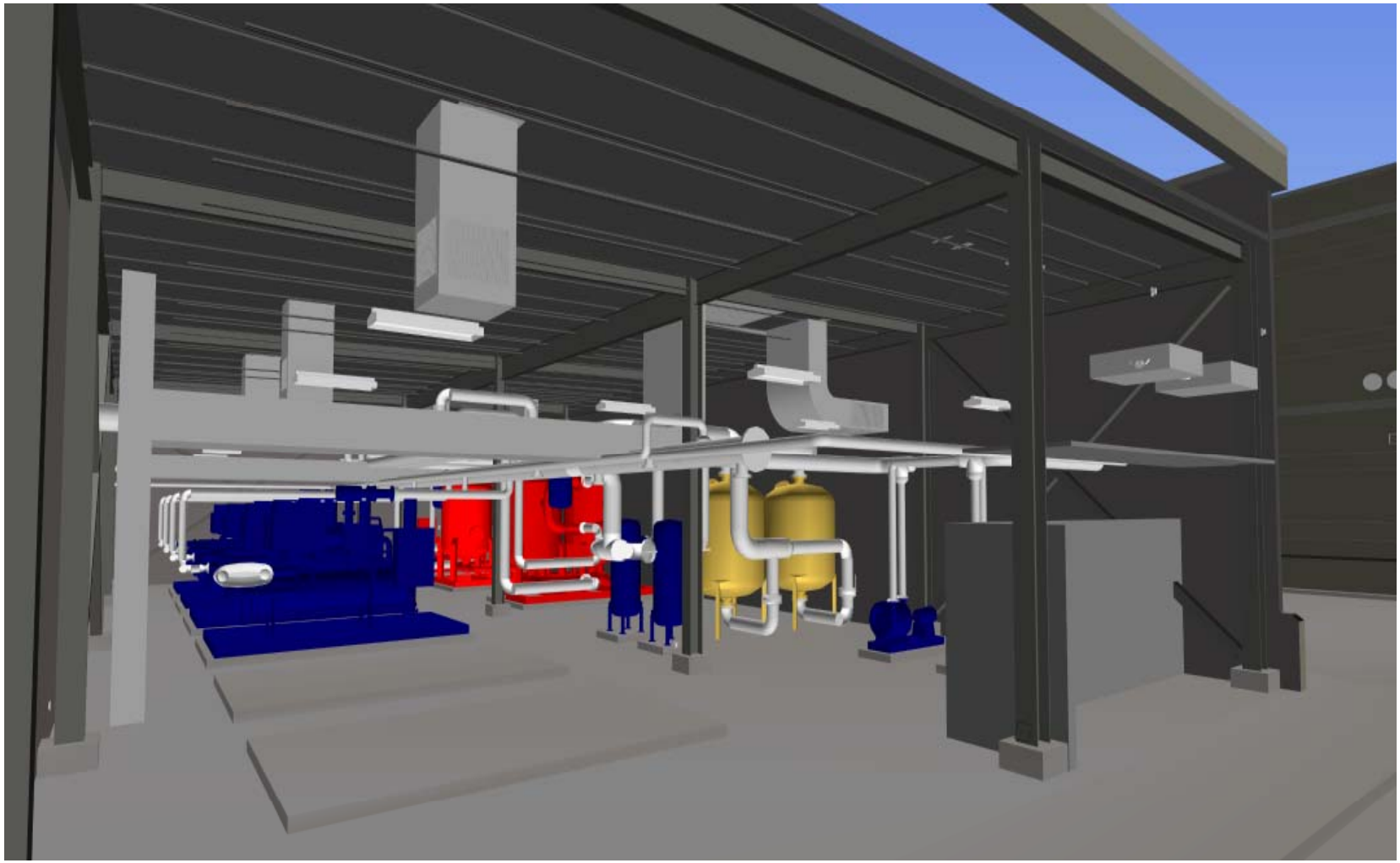
# THP Slab/Pre-dewatering

# Digester #3

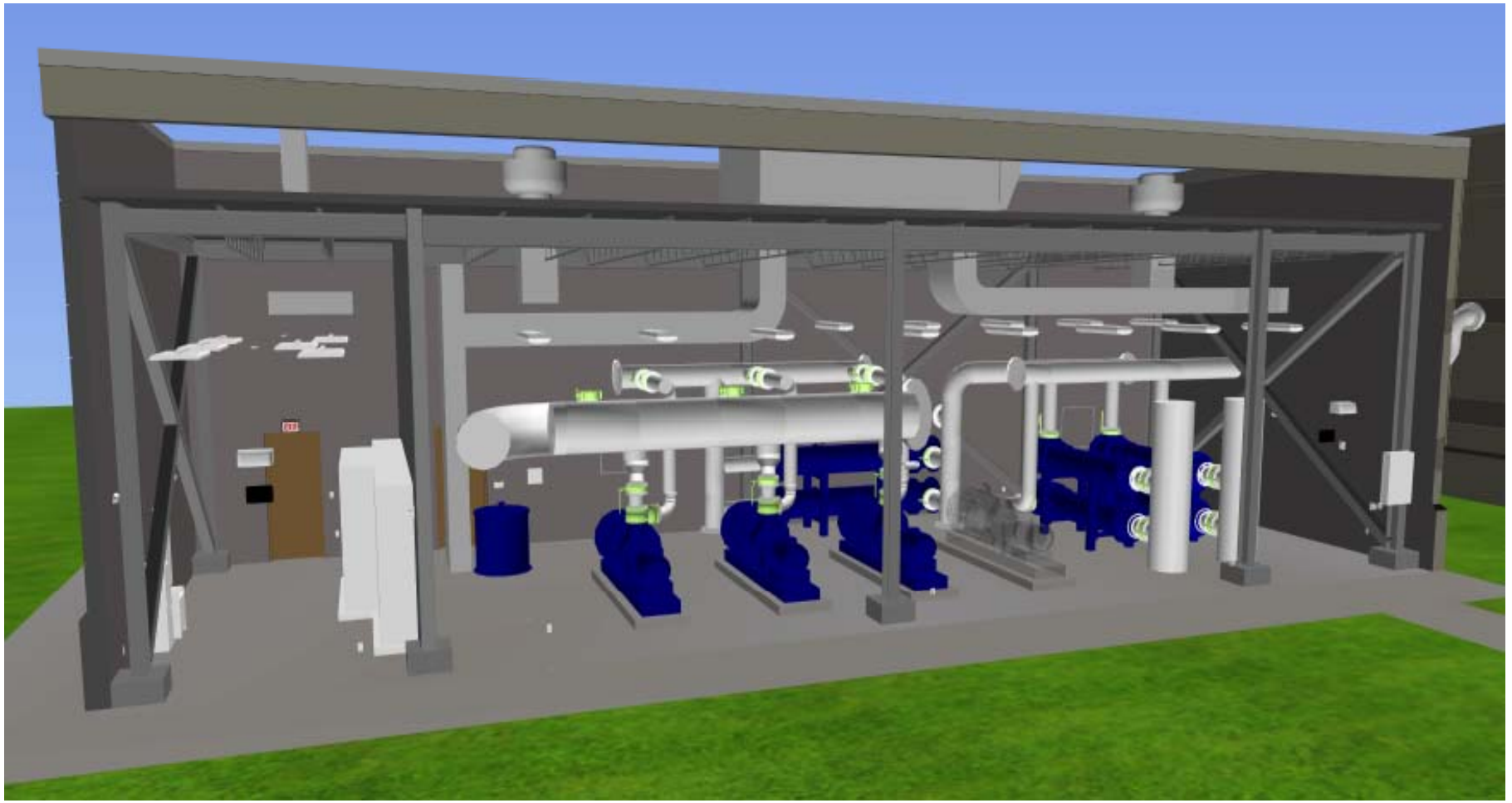
# Turbines



# Gas Conditioning



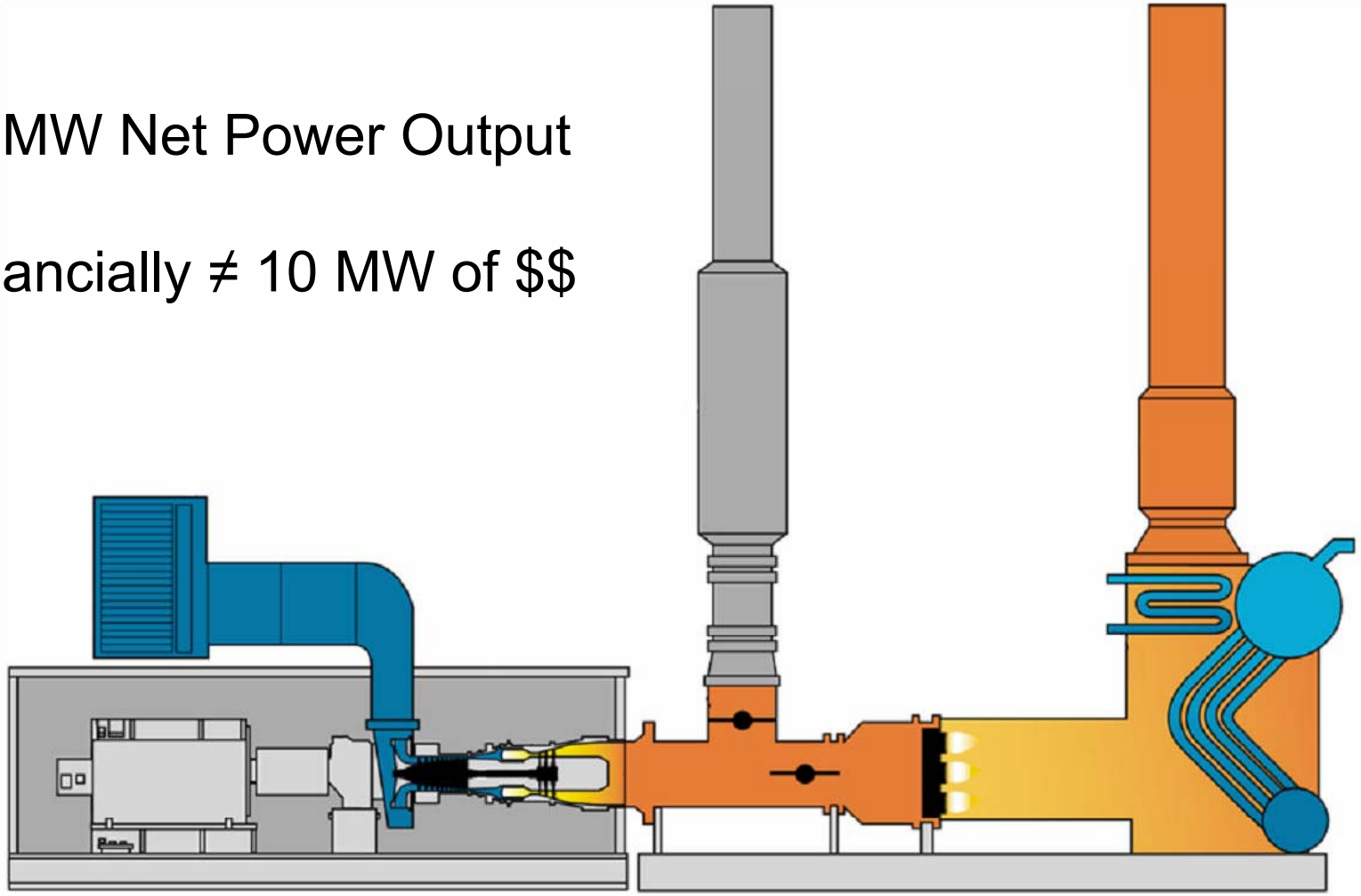
# Gas Blowers



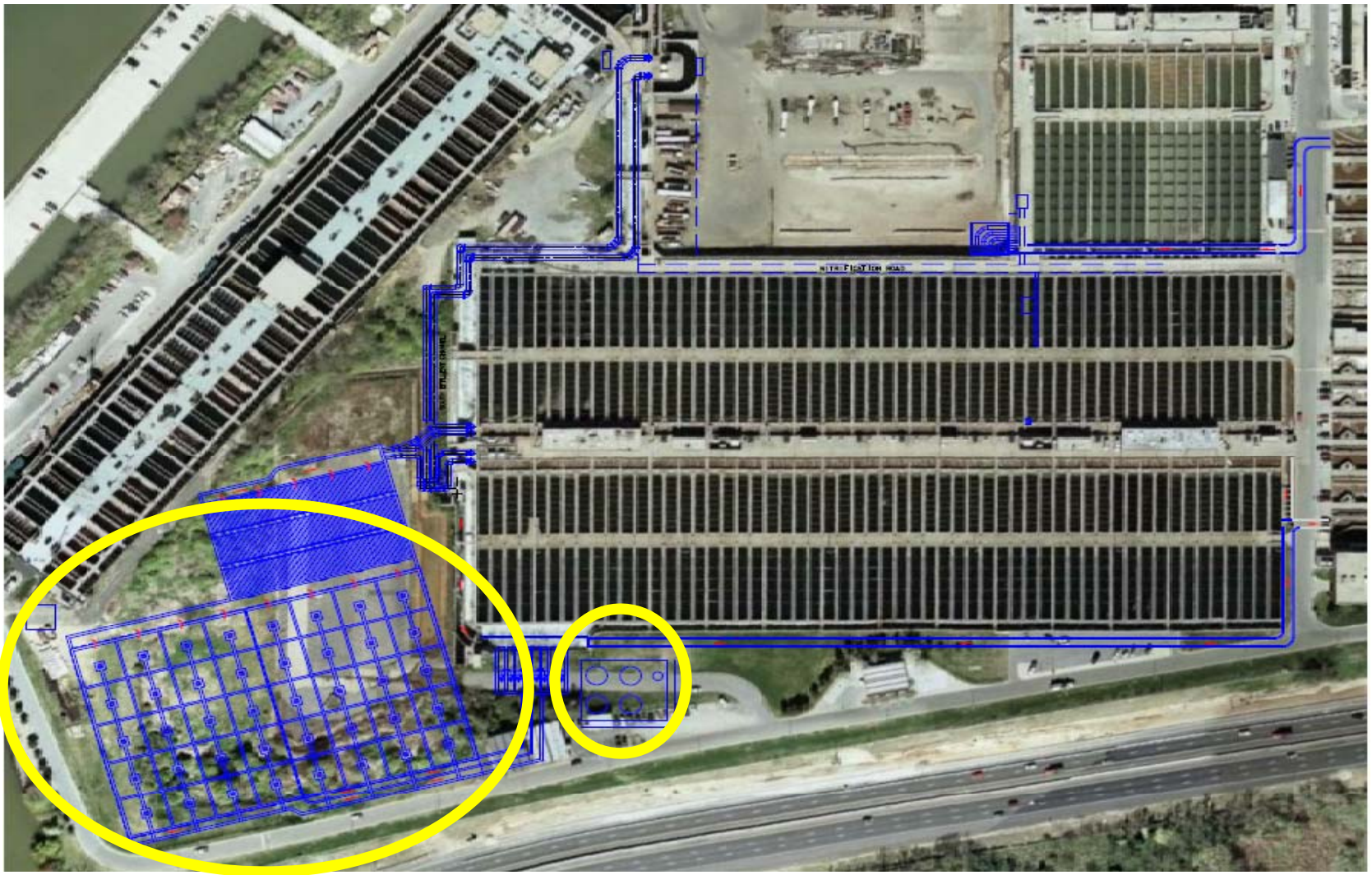
# Turbine Savings

10 MW Net Power Output

Financially ≠ 10 MW of $$



# New ENRF Facilities



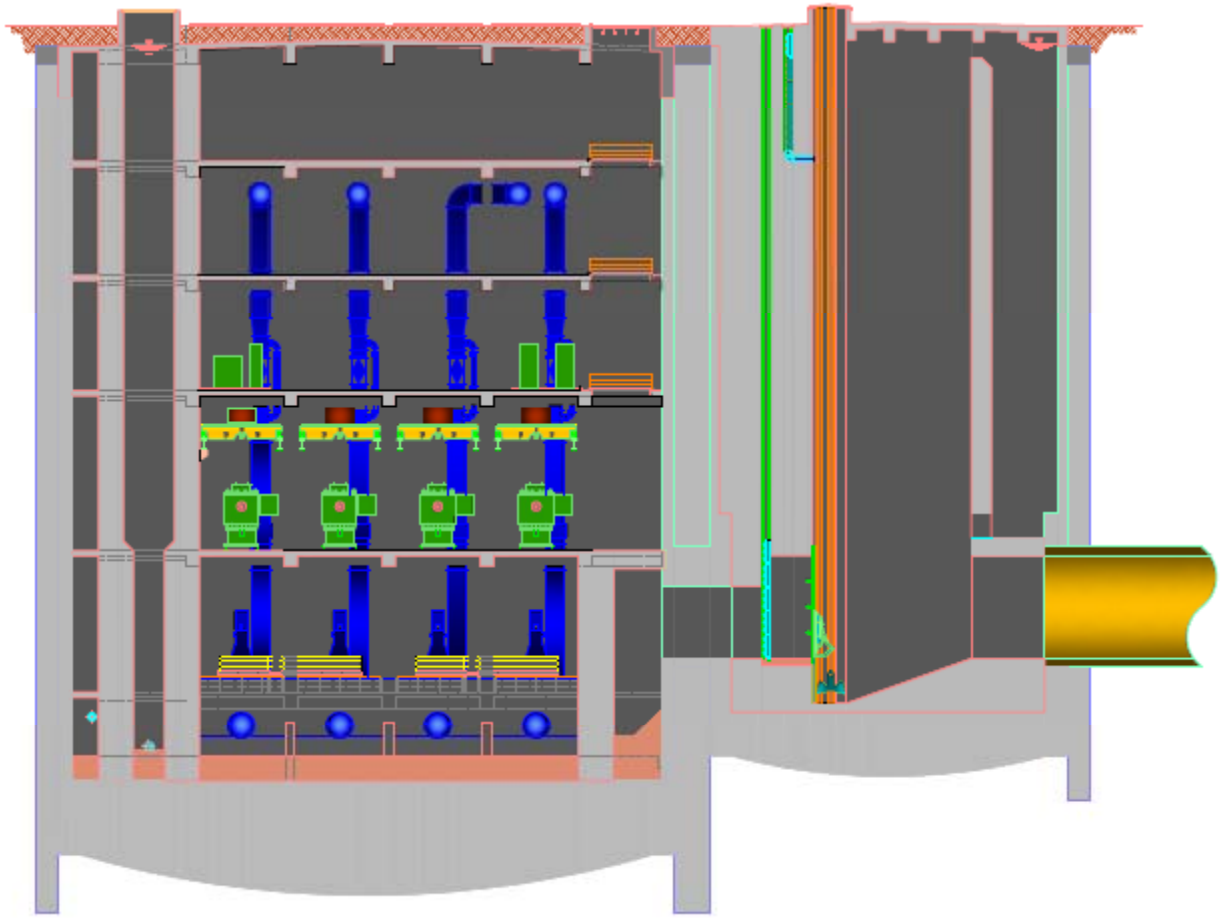
# 40 MG of Denit Volume

# Deep Channels and Rx

# 1 BGD ML PS

3 MW Additional Power
For ENRF

# TDPS/ECF

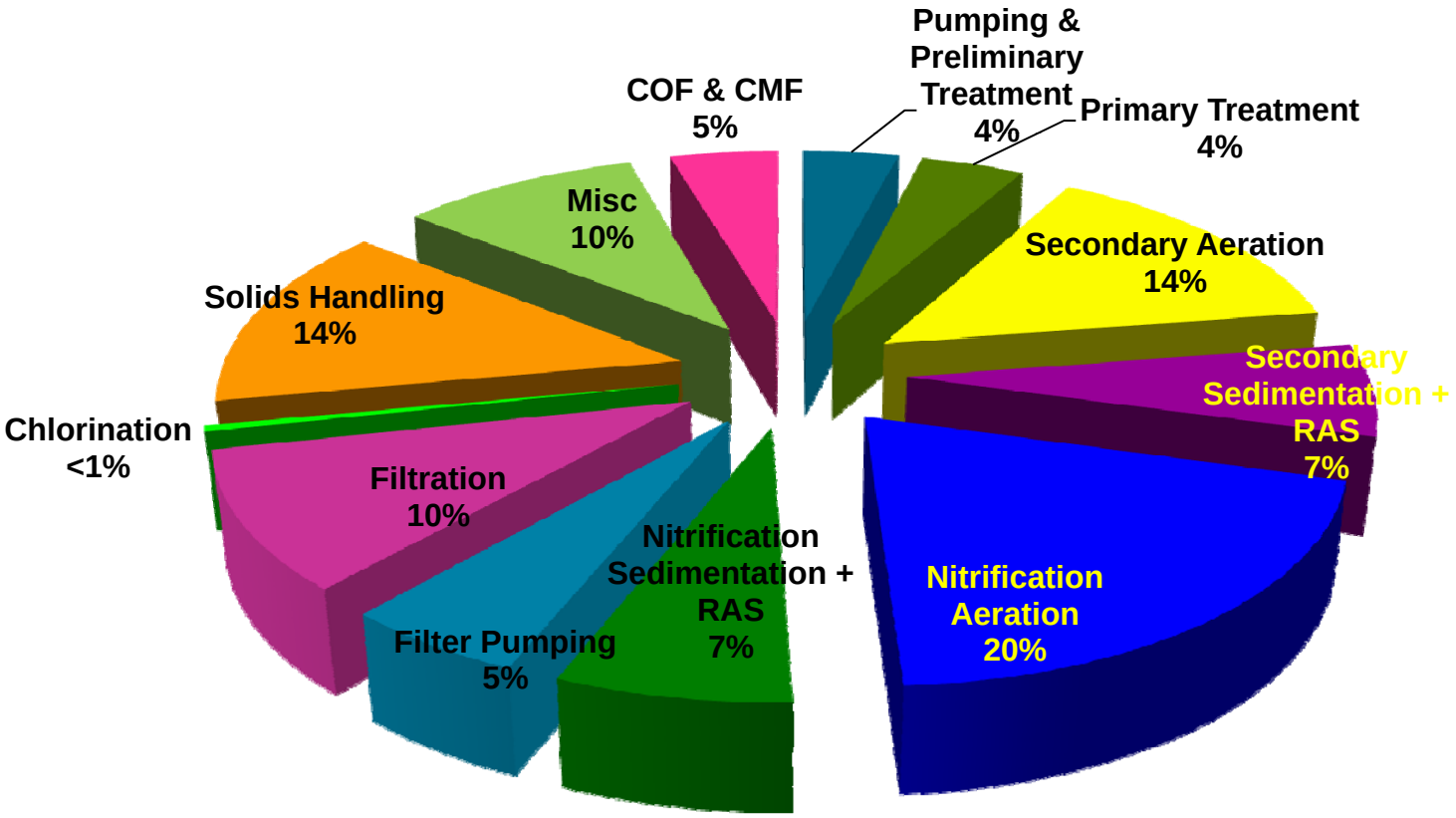


12 MW Additional Power For TDPS/ECF

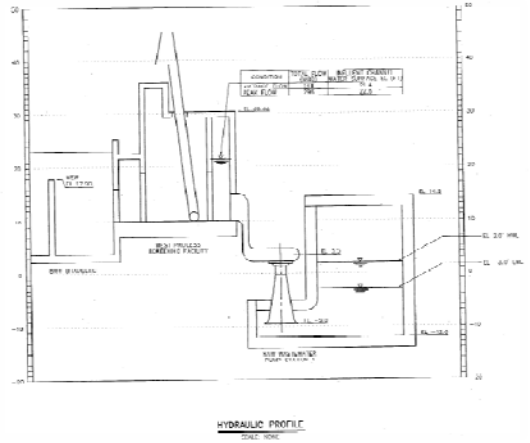
# Power Math

| | |
|---|---|
| • Recent Past | 33 MW |
| • Present Usage | 25 MW |
| • CHP (10 MW Net) | 15 MW |
| • ENRF (+3 MW) | 18 MW |
| • Other Upgrades (2 MW) | 20 MW |
| • TDPS/ECF (+12 MW) | 32 MW |

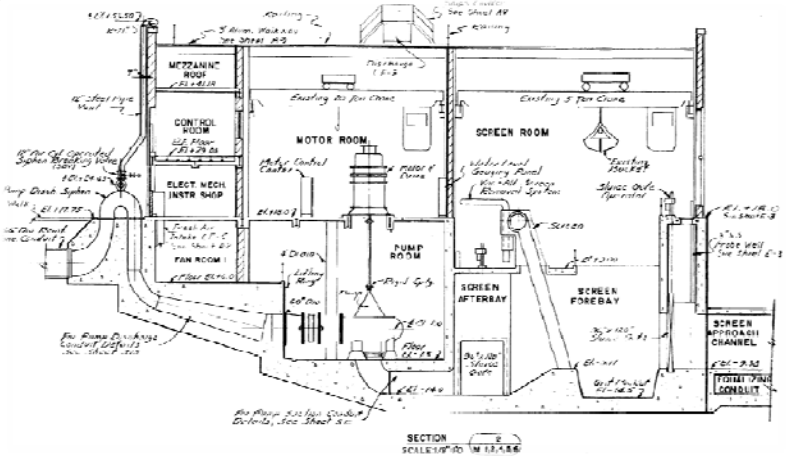
# Breakdown of Electricity Consumption Blue Plains



RWWPS1(West)




RWWPS2(East)



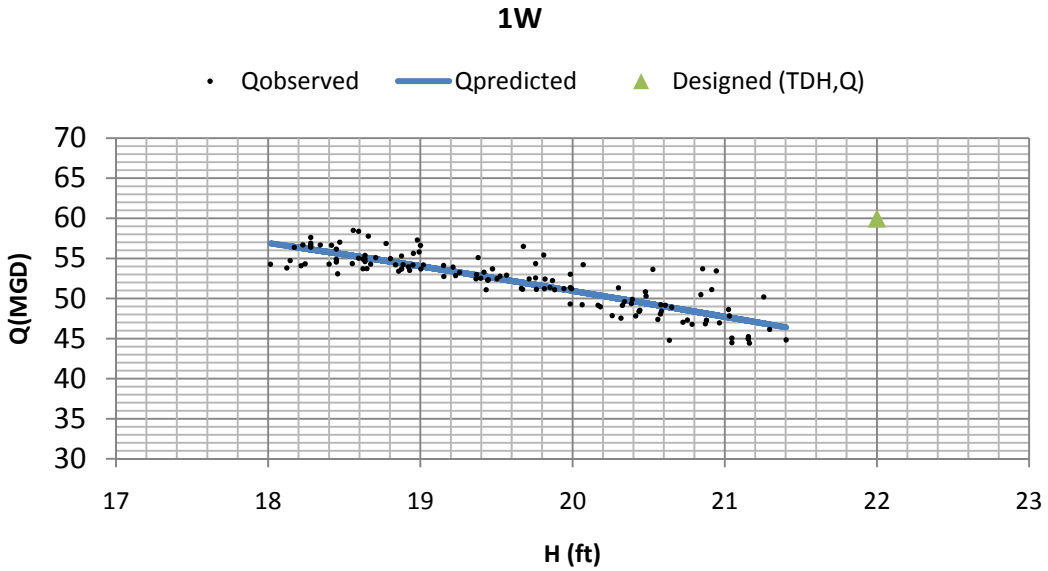

*Flow prediction*

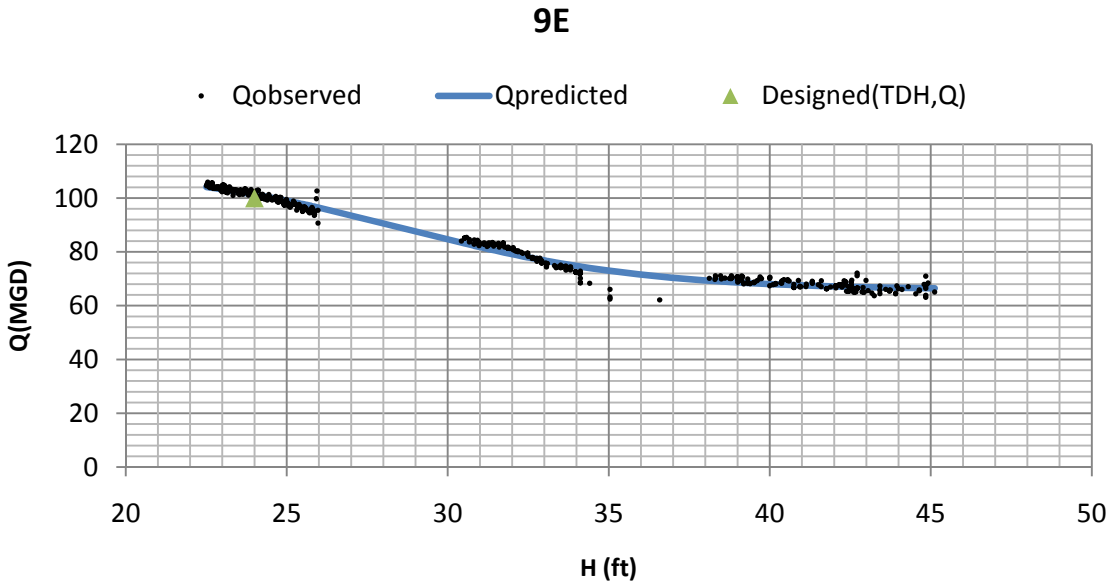
| Input | Pump Performance Curves Formulation | Output |
|---|---|---|
| * Pump on service<br>* Pump speed<br>* Wet-well level | (Head-Discharge) | * Discharge of each pump<br>* Total discharge |

*Power prediction*

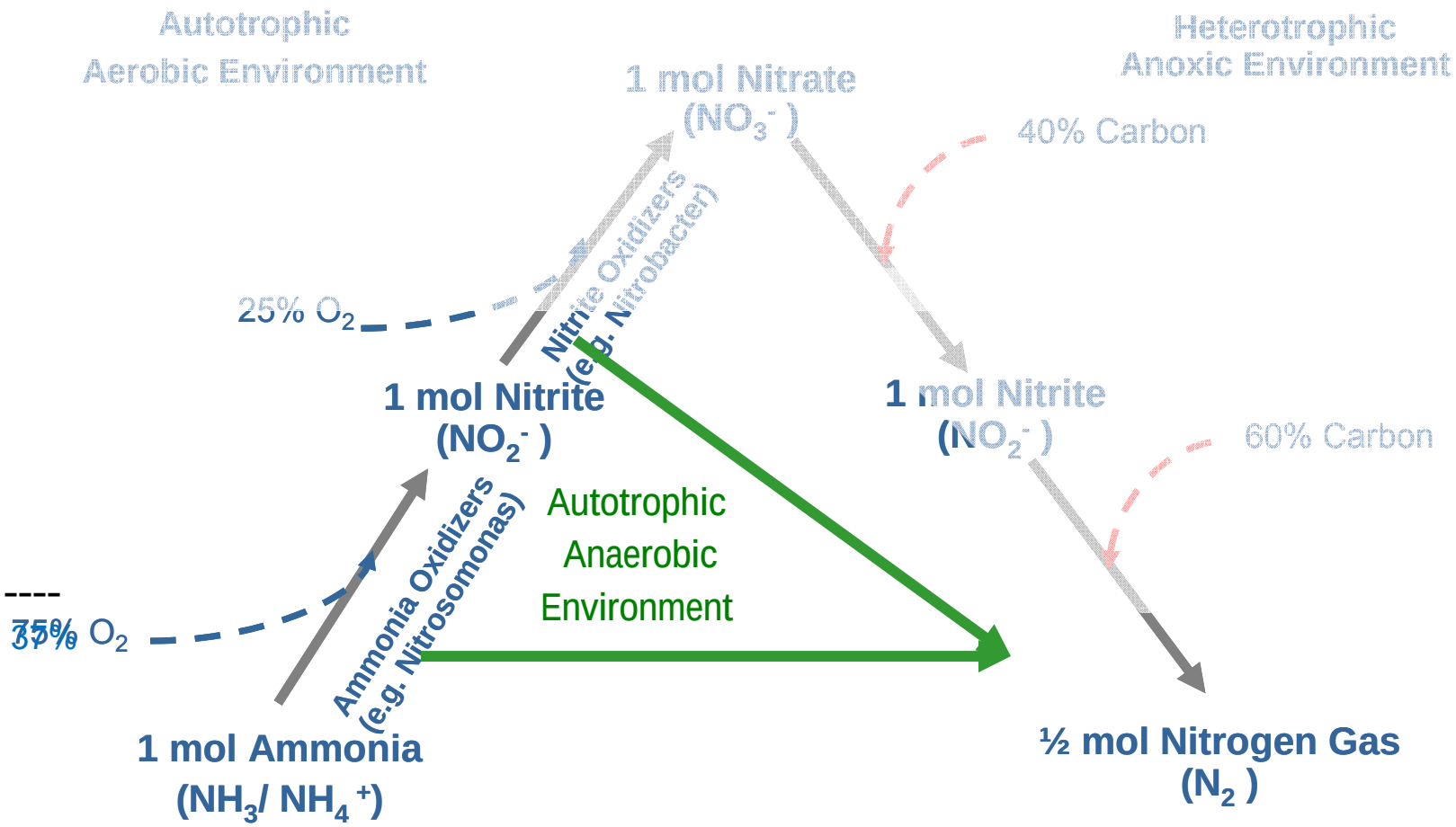
| Input | Pump Power Consumption Equations | Output |
|---|---|---|
| * Pump on service<br>* Pump speed | | *Power consumption of each pump<br>*Total Pumping Power |


24

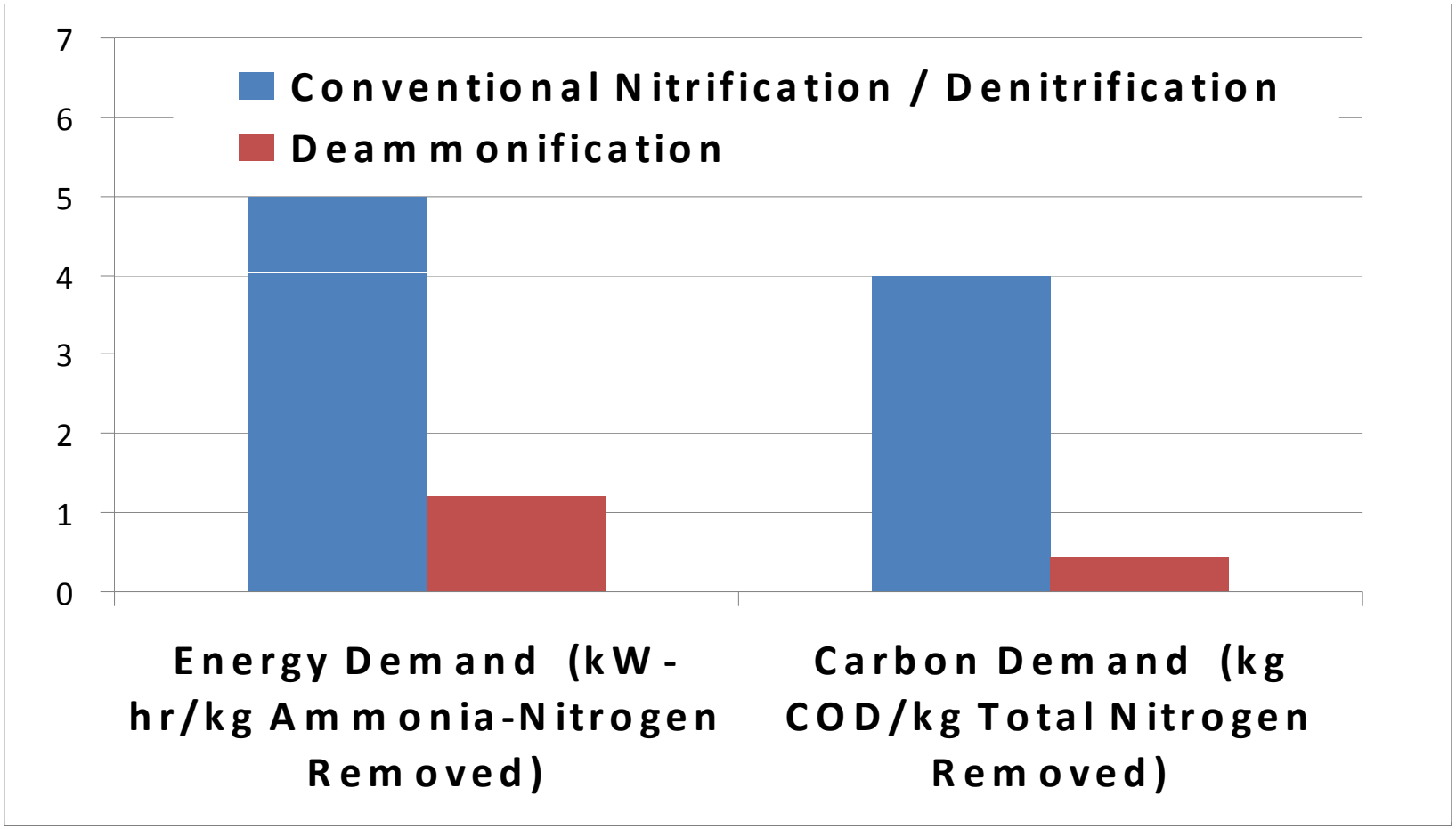

1W
Qobserved
Qpredicted
Designed (TDH,Q)
Q(MGD)
70
65
60
55
50
45
40
35
30
17
18
19
20
21
22
23
H (ft)

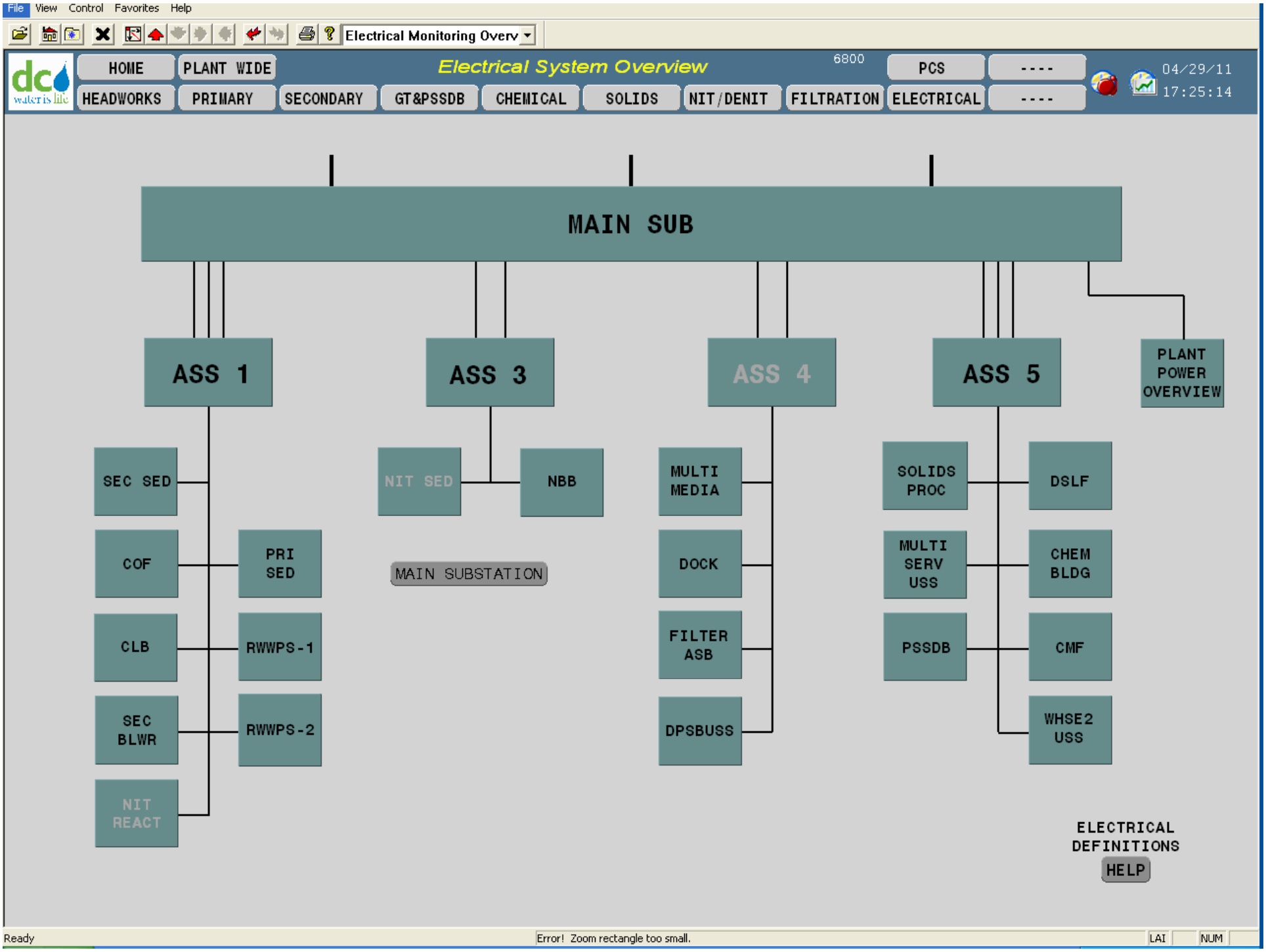

9E
Qobserved
Qpredicted
Designed(TDH,Q)
Q(MGD)
120
100
80
60
40
20
0
20
25
30
35
40
45
50
H (ft)

# Deammonification



# Filtrate Deammonification




File View Control Favorites Help
Electrical Monitoring Overv
HOME
PLANT WIDE
Electrical System Overview
6800
PCS
----
HEADWORKS
PRIMARY
SECONDARY
GT&PSSDB
CHEMICAL
SOLIDS
NIT/DENIT
FILTRATION
ELECTRICAL
----
04/29/11
17:25:14
MAIN SUB
ASS 1
ASS 3
ASS 4
ASS 5
PLANT POWER OVERVIEW
SEC SED
COF
PRI SED
CLB
RWWPS-1
SEC BLWR
RWWPS-2
NIT REACT
NIT SED
NBB
MAIN SUBSTATION
MULTI MEDIA
DOCK
FILTER ASB
DPSBUSS
SOLIDS PROC
DSLF
MULTI SERV USS
CHEM BLDG
PSSDB
CMF
WHSE2 USS
ELECTRICAL DEFINITIONS
HELP
Ready
Error! Zoom rectangle too small.
LAI
NUM

9.5 Miles of Fiber Optic Cable for Data Highway

1 Mile of Fiber Optic Cable for Remote I/O

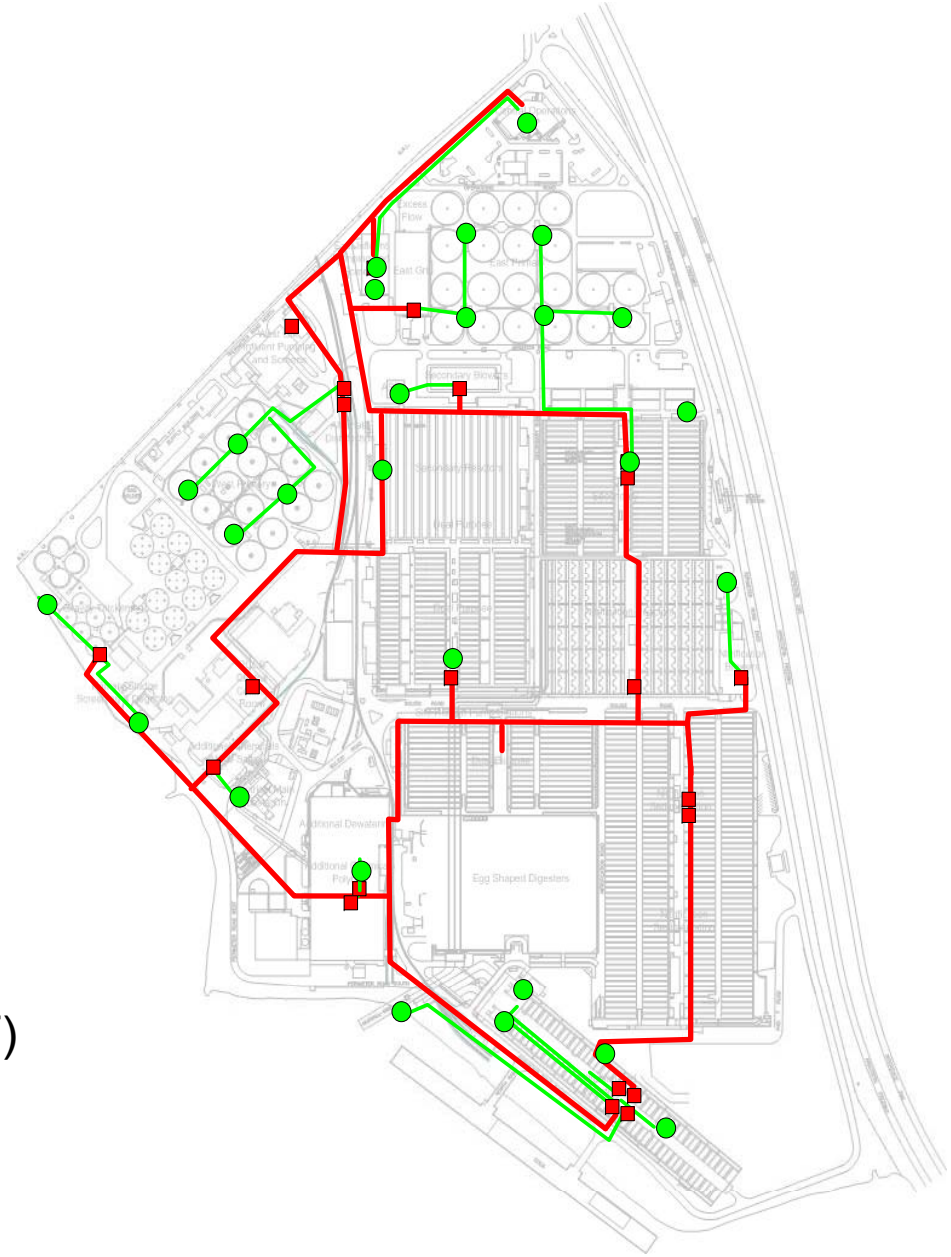
23 DCUs Installed

33 RIOs Installed

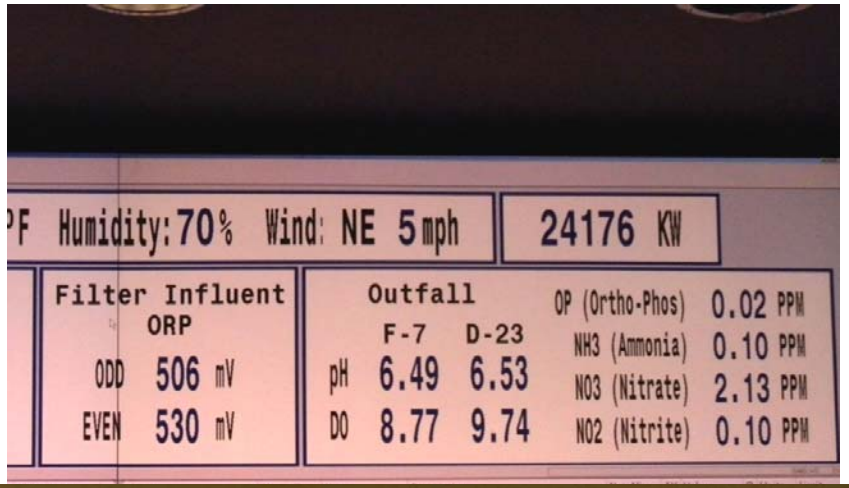
31 Operator Workstations (OWS)

6 Operator Interface Terminals (OIT)

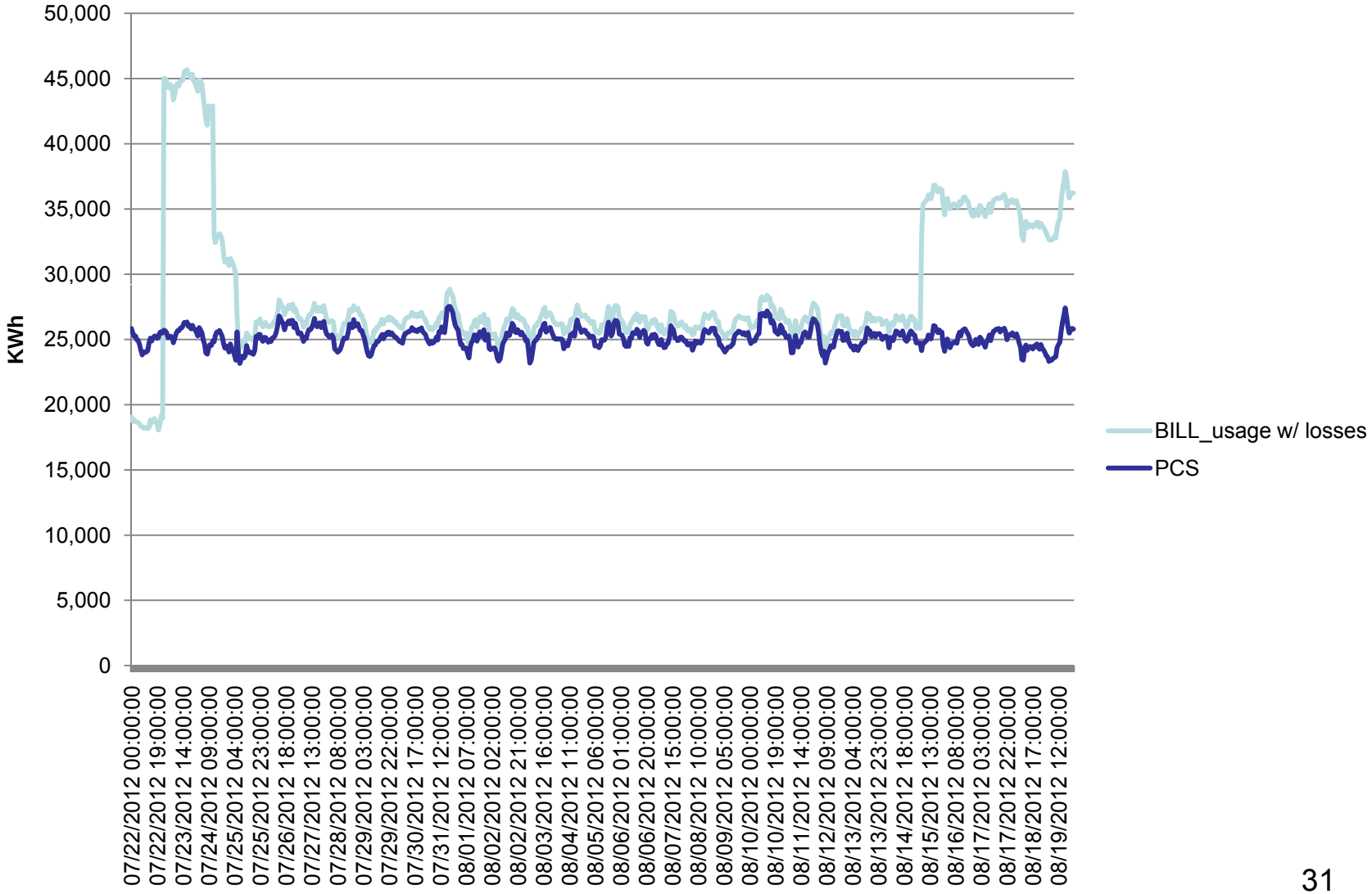
32,500 I/O Points Terminated



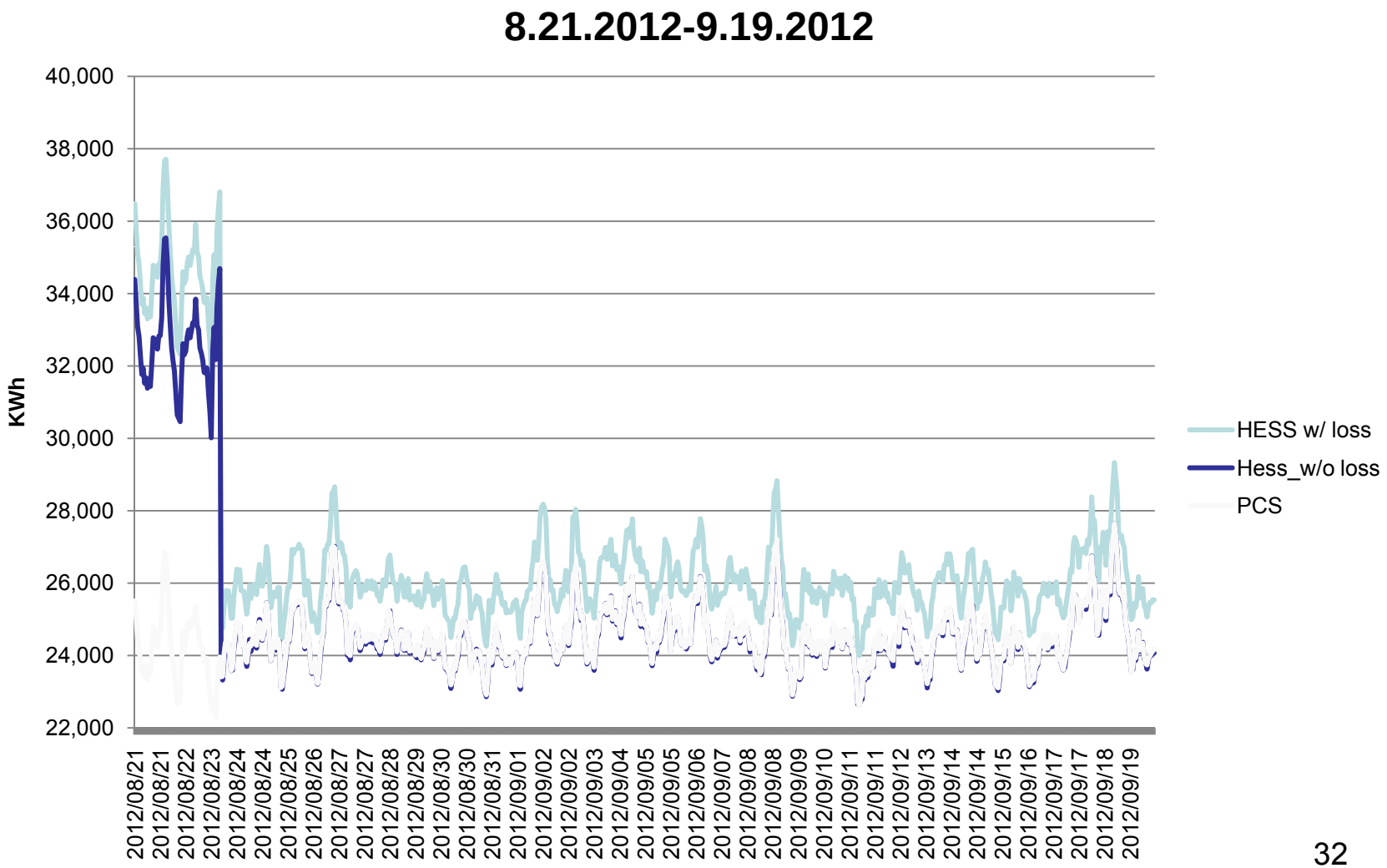
dc water is life




# July/Aug 2012



# Aug/Sept 2012



# PJM Response Program

Demand Response Program

- Reduction of electric demand at the end-use level
- Help meet regional supply during high-demand periods or grid instability (hot weather, loss of generating capacity)

PJM Pays for the Ability to Shed Load and/or Use Existing Equipment

- Use existing equipment (i.e. emergency generators)
- User always receives payment even if event does not occur
- Commit to reduce load by reducing use (i.e. pumps and compressors)

Per PJM program requirements, events may only occur on business days from June through September and no more than ten events can occur per year for a maximum of six hours per event (60 hours/year)

# Questions ?

- Y • Digester gas
- Y • Photovoltaic
- Y • Wind
- Y • Hydro