THERMAL HYDROLYSIS

MAXIMIZING WATER TREATMENT ACROSS CITY OF FRANKLIN, OHIO'S MEDINA COUNTY, AND MICHIGAN'S OAKLAND COUNTY

INTRODUCTIONS

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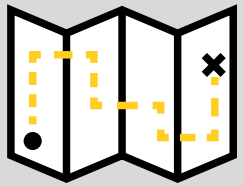
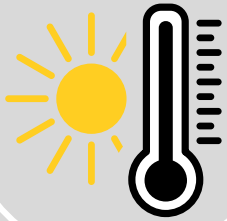
SAFETY TIPS FOR VISITING A FACILITY WITH A THP SYSTEM



STAY WITHIN DESIGNATED AREAS

WEAR REQUIRED SAFETY GEAR

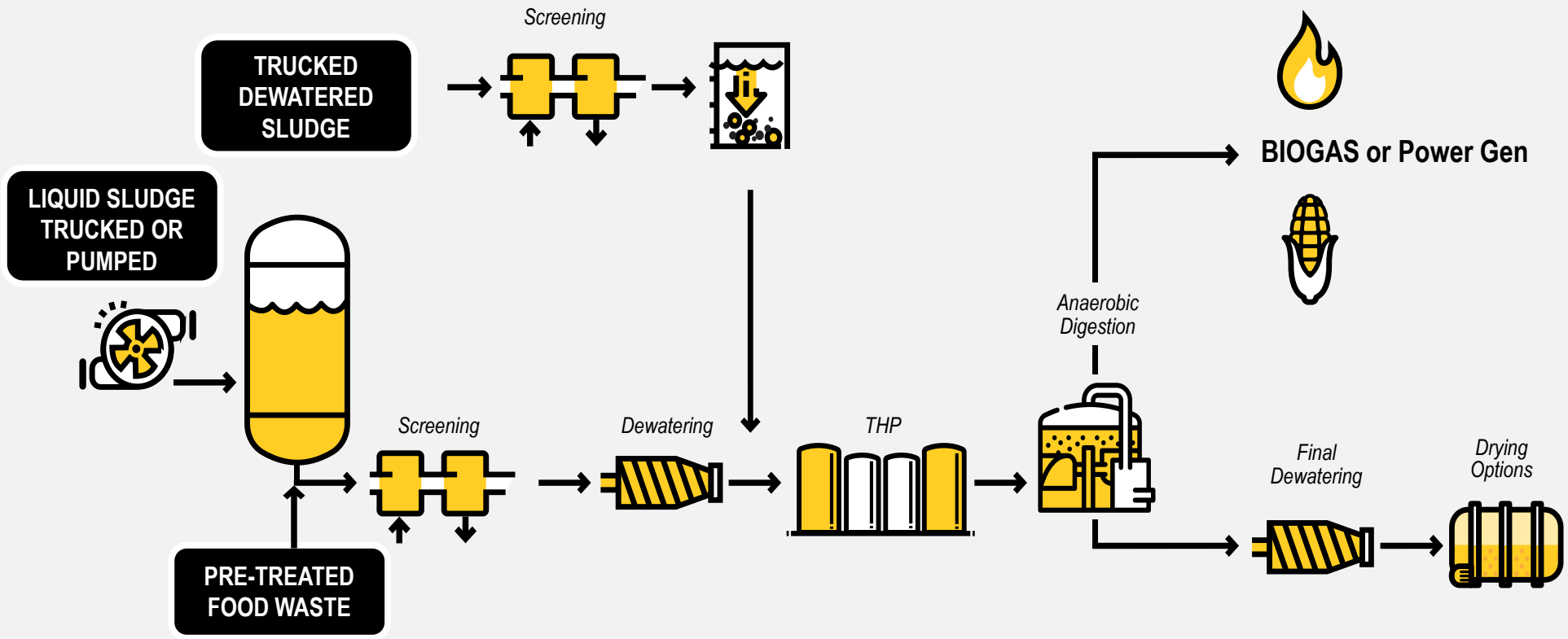


BE CAUTIOUS OF HIGH-TEMP. EQUIPMENT

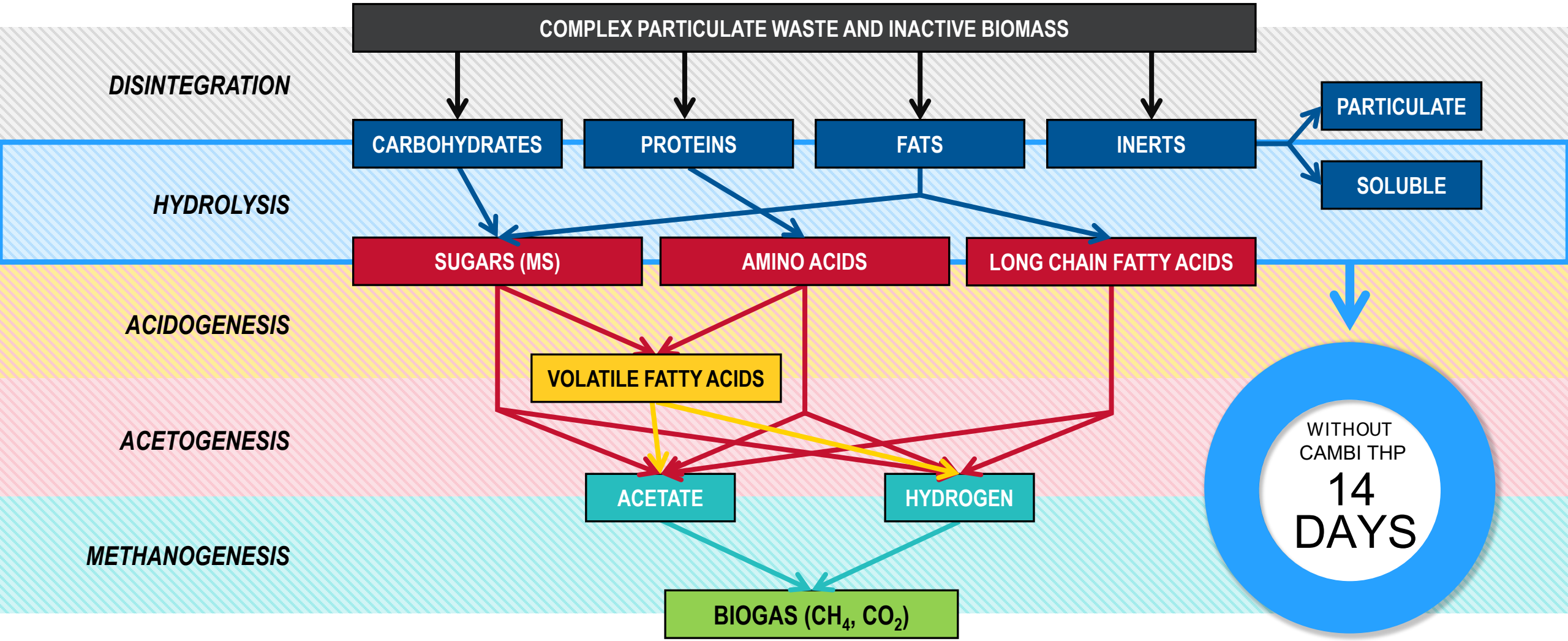
WATCH YOUR STEP

FOLLOW EMERGENCY INSTRUCTIONS

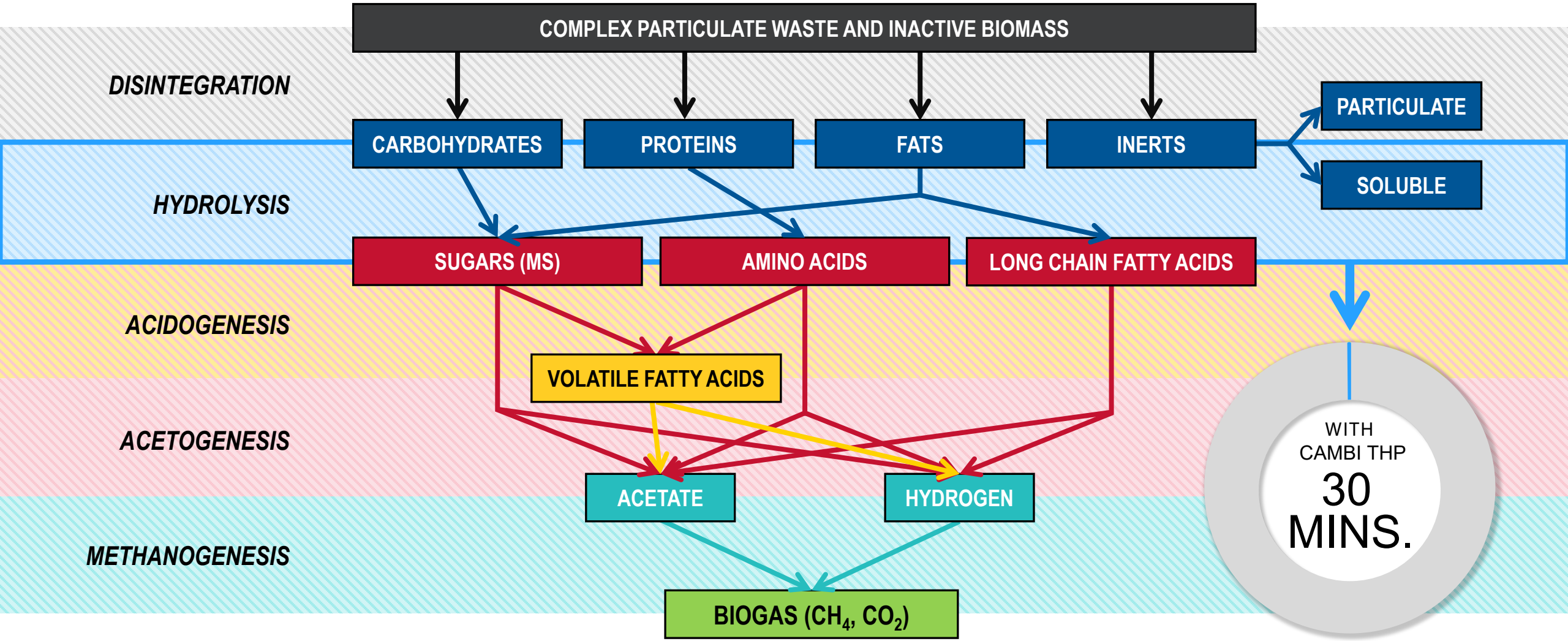
ANAEROBIC DIGESTION DEWATERING & DRYING



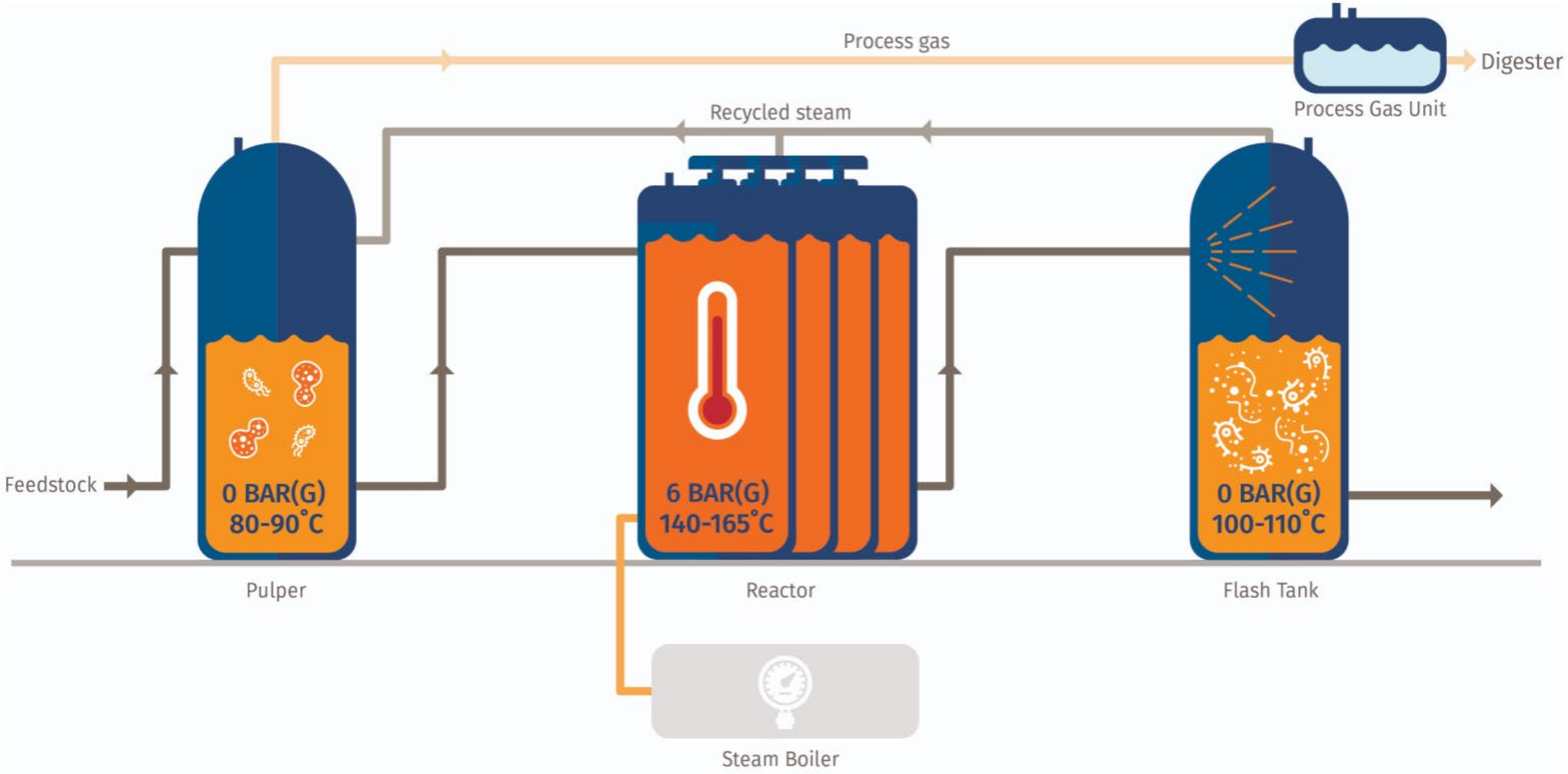
WHY THP IS THE FUTURE?



WHY THP IS THE FUTURE? HYDROLYSIS IN 30 MINS, NOT 2 WEEKS

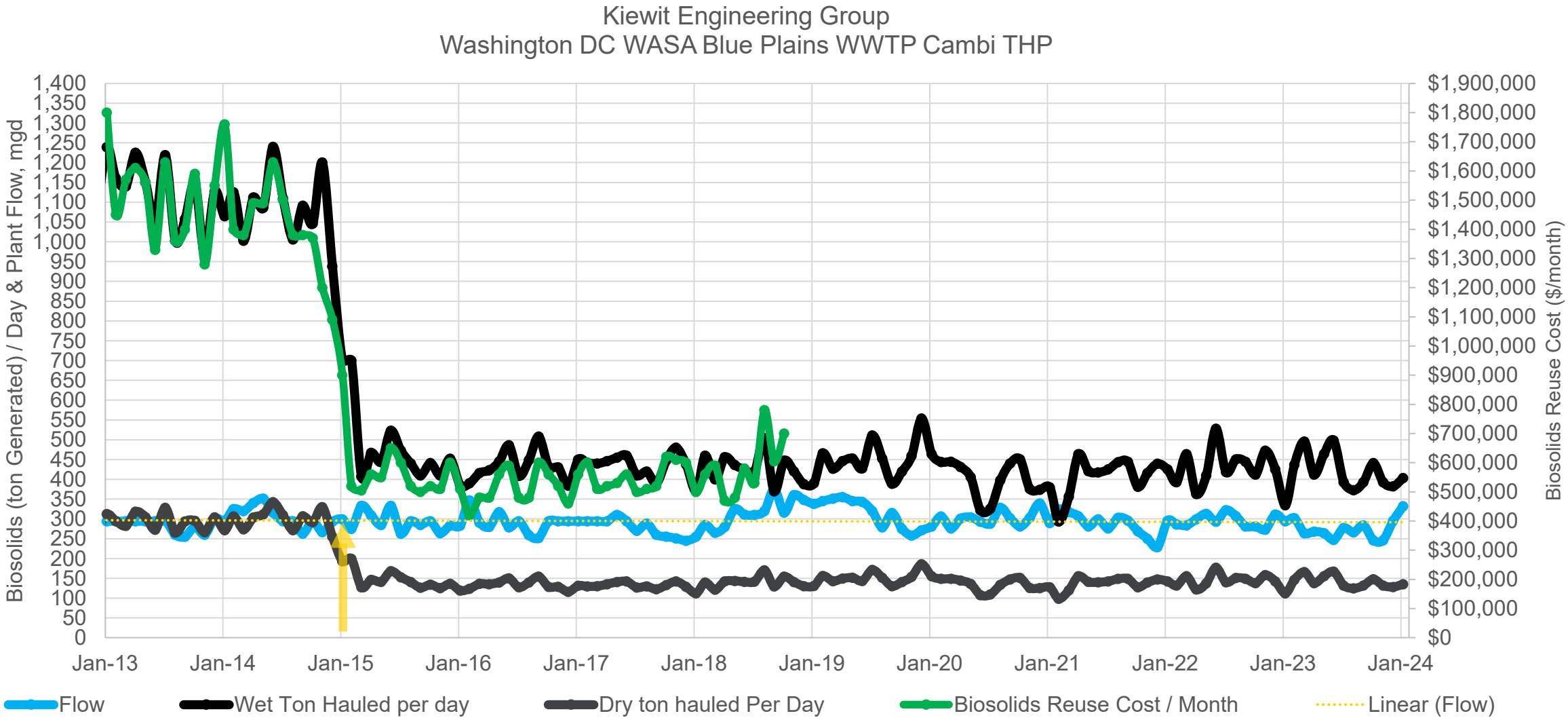


THERMAL HYDROLYSIS SYSTEM OPERATION



SEEING THE BENEFITS THROUGH DATA

Washington, DC Blue Plains WWTP



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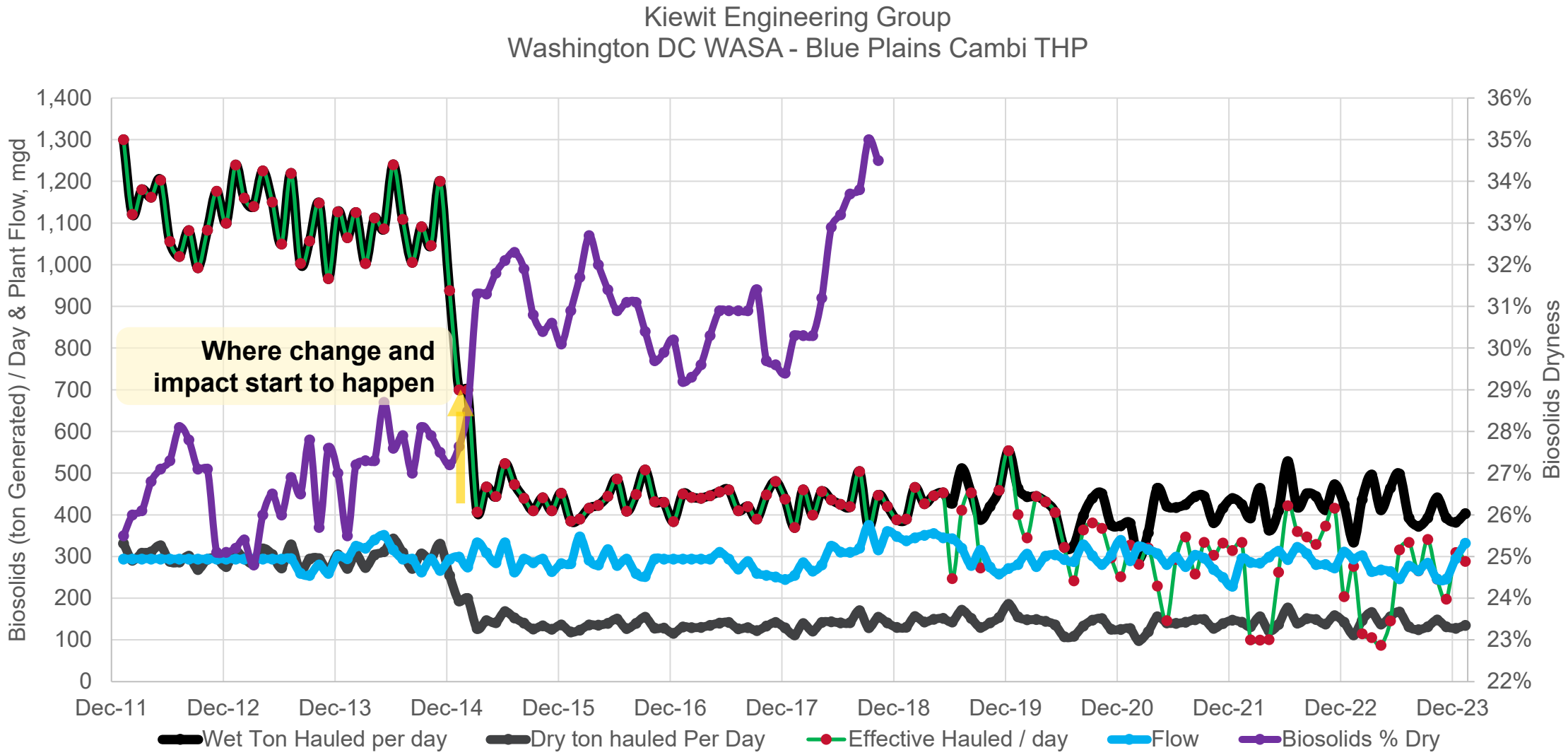

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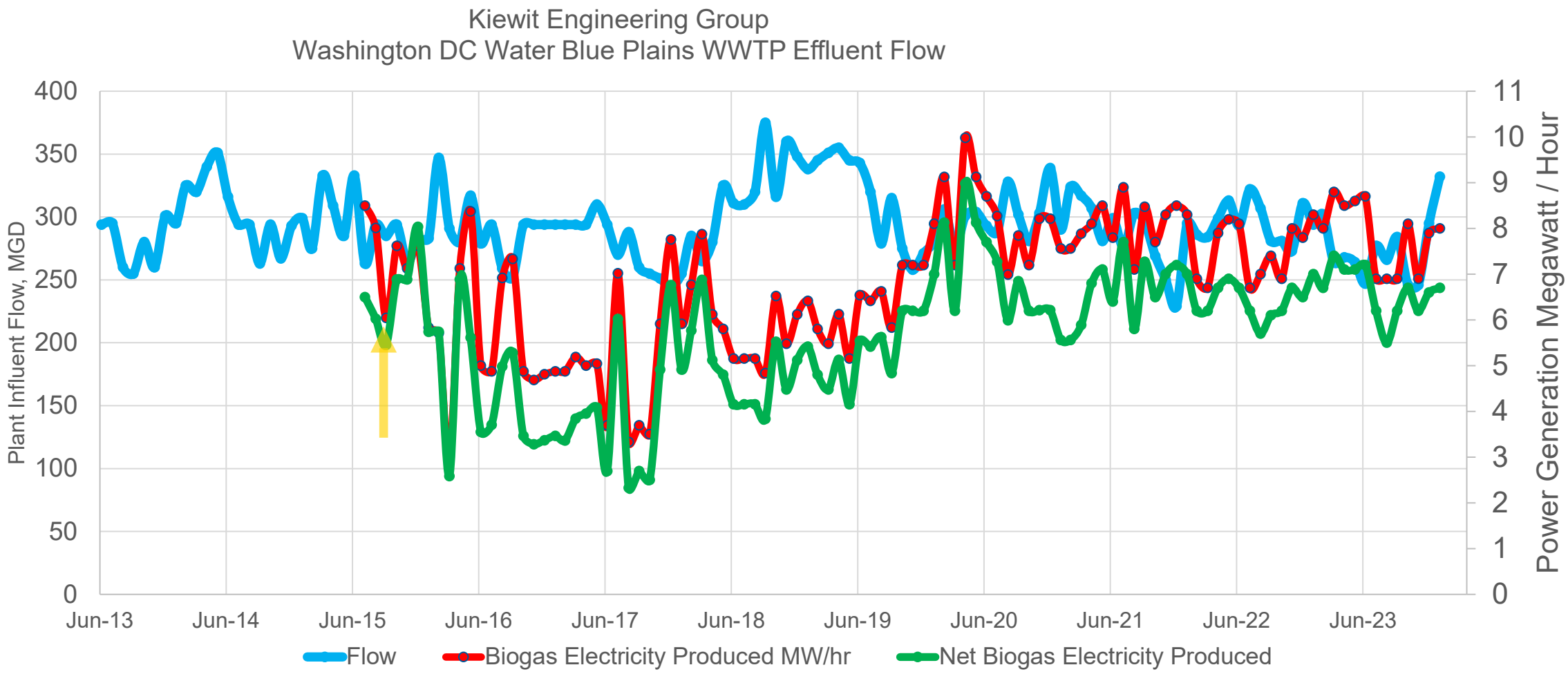

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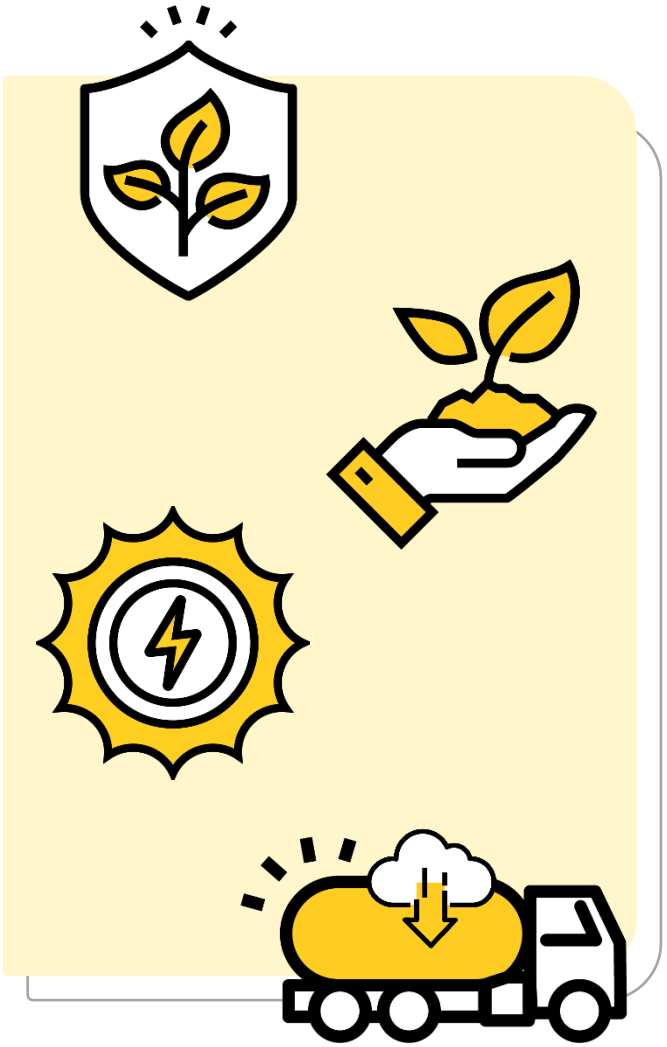


Operations Start: January 2013

Flow Rate: 400 mgd

Biosolids Reduction and Hauling: 500 tons/day; lower transportation costs and environmental impact

Cost Savings: $1 million/month on biosolids reuse

Increased Biosolids Dryness: Consistent improvement in biosolids dryness percentage, resulting in reduced hauling volume and potential for further treatment or beneficial use.

Optimized Plant Operation: Correlation between plant flow and biosolids generation suggests effective process control and energy efficiency.

Stable Biogas Production: Consistent output year-round.

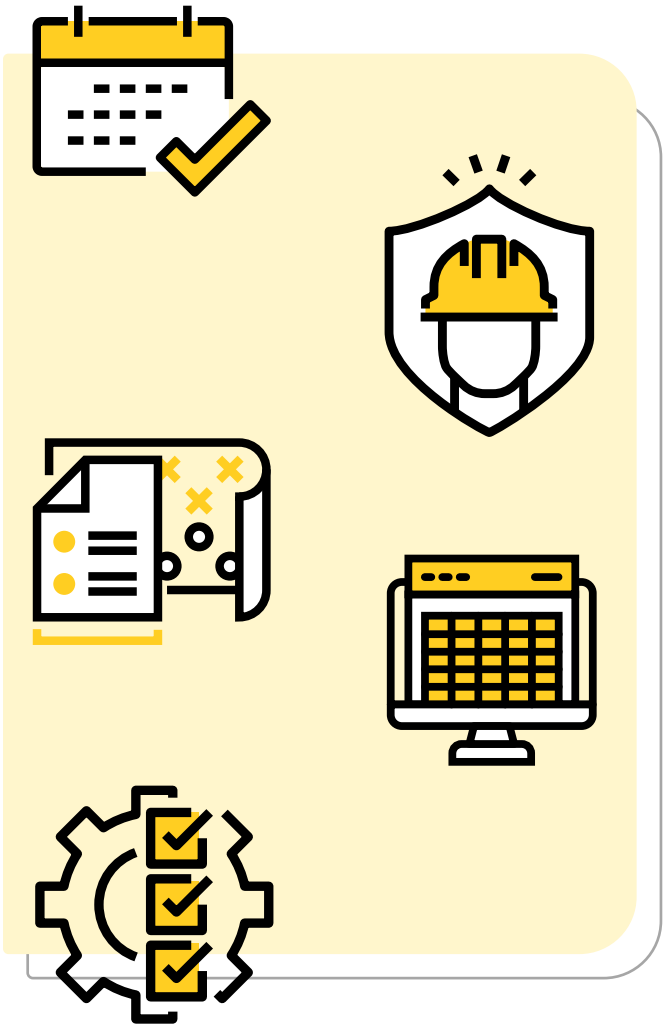
Energy Potential: Significant biogas for electricity, heat, or other uses.

FRANKLIN WATER RECLAMATION THERMAL HYDROLYSIS SYSTEM

START-UP AND COMMISSIONING PLAN DEVELOPMENT

- Kiewit Industrial and Water Engineering (KIWE) — developed start-up and commissioning plans in partnership with the project start-up team

START-UP AND COMMISSIONING PLAN DEVELOPMENT



Comprehensive start-up, testing, and commissioning plans broken down by module included the following:

a) Schedule

b) Safety precautions and troubleshooting guides

c) Contingency plans

d) Certification of proper installation forms

e) PLC I/O sign-off forms

f) Instrument calibration forms

g) Operational readiness testing procedures

h) Functional demonstration testing procedures

i) System commissioning procedures

j) Performance testing procedures

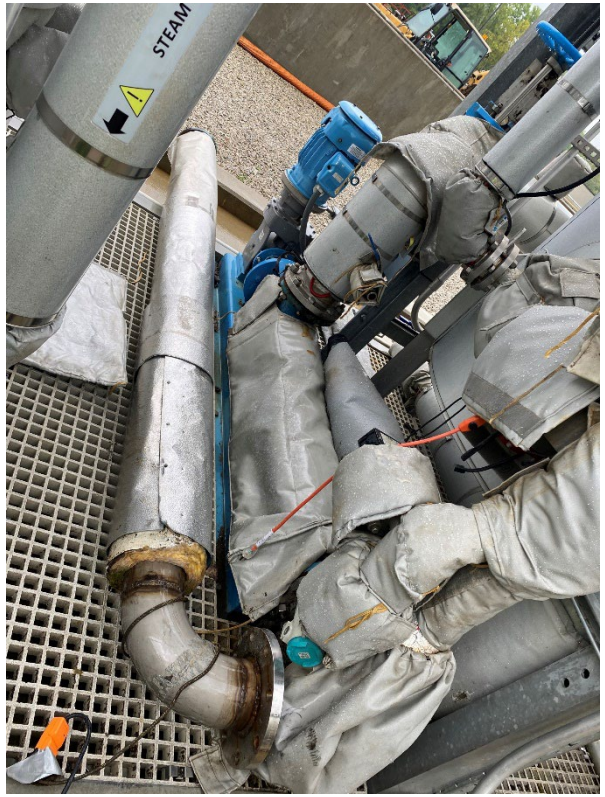
STARTUP AND COMMISSIONING PLAN DEVELOPMENT

- Commissioning activities included purging the digester system with nitrogen and seeding the digesters with Class A biosolids from Blue Plains WWTP
- KIWE provided in person training to commissioning and O&M team as well as a Unit Process Control Manual for each group of modules

FRANKLIN, TN

- Screw conveyors specified with over torque protection with shear pins (sheared many times – replaced with roller chain couplings without shear pins).
- Plant staff struggled for first year of operations

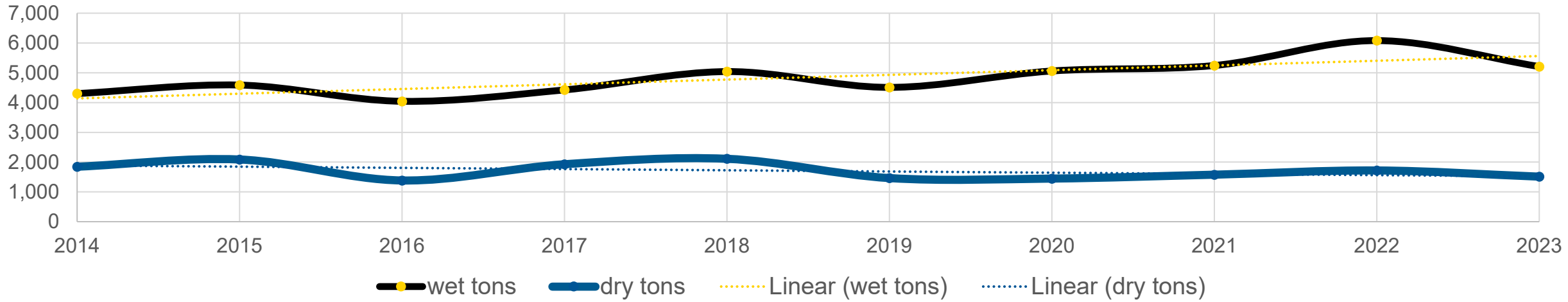
MEDINA, OH



MEDINA, OH

- THP reactor was exposed to elements and froze in winter
- Poor maintenance access
- Control panels were exposed to elements and needed to install tent to block wind and rain
- Wet cake bin was exposed to elements
- Biogas engine generator had common exhaust header, so condensation formed in exhaust duct and leaked into off-duty generator, causing severe corrosion and damage
- Very tight and poor maintenance access in pre-dewatering and final dewatering building
- Frequent progressing cavity pump stator replacement

MEDINA, OH (SOLIDS TOTALS)



OAKLAND COUNTY (CLINTON RIVER, MI)

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- No training and commissioning support provided by contracted team
- Pre-dewatering sludge blend tanks are too small
- Lacked inspection ports for THP reactors
- Air changes per hour in steam boiler room were inadequate, and the boiler room was so hot, workers could not enter to work there
- No spare capacity for pulper or flash tank provided
- Foul gas skid and biosolids belt conveyors froze in winter months
- No spare foul gas skid spare parts
- Hydrogen sulfide gas buildup below pre-dewatering equipment caused maintenance hazards and corrosion issues
- Control room was not sealed from process flows, and air conditioner units
- wore out constantly
- Excess polymer dose caused digester foaming
- Annual Cambi THP system shutdown caused odor issues and was expensive to haul odorous class B cake


Thank
You!

FRANKLIN, TN