GreenWhey ENERGY, INC.

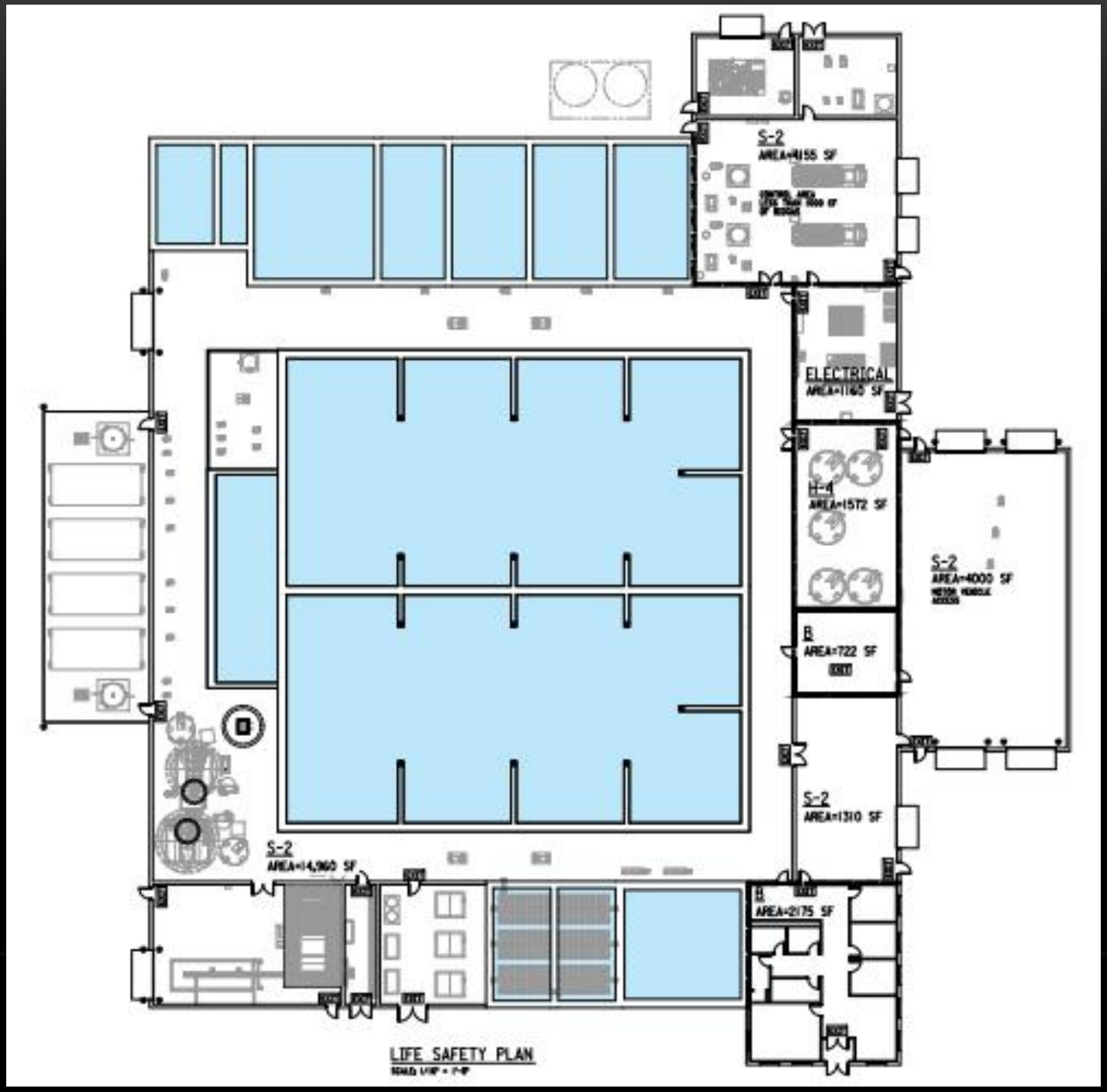
Facing Adversity as a Waste-to-Energy Start-Up

HOW IT ALL STARTED…

- GreenWhey was born of a partnership between a cheese maker and two waste water haulers.
- Founded in 2009, after waste water issues put increasing strain on the regional cheese industry.
- Facility finally commissioned in July of 2013.

HOW IT WORKS

- Anaerobic digester with capacity for 450,000 gpd of high strength wastewater.
- Wastewater is fed to digesters, which emit biogas (methane and CO2).
- Biogas supplies two generator units, producing 3.2 MW of power at capacity.
- Water treated and discharged to municipal WWTP.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AREA=4155 SF
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LIFE SAFETY PLAN

BUSINESS PHILOSOPHY

- Built as a complete solution for the wastewater issues of the regional cheese industry.
- Charges tipping fees and derives additional income from electricity sales.
- Designed to handle cheese manufacturing wastewater and permeate.
- Waste streams characterized by very high soluble BOD and phosphorus concentrations.

STARTUP CHALLENGES

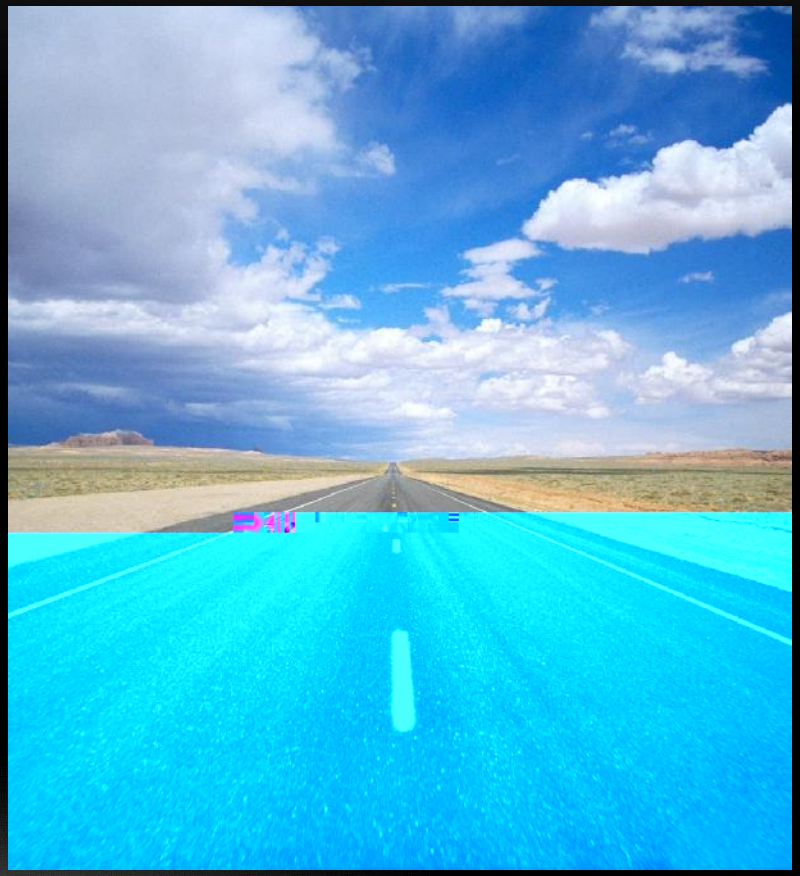
- Facility met large challenges in its first year.
- Large market developed for whey permeate, removing largest source of BOD feedstock.
- Cheese manufacturers cut back on production due to high milk prices.

BACK TO THE DRAWING BOARD…

- Changes meant GreenWhey management had to get creative.
- Expanded vision to encompass entire food and beverage industry.
- Took a three-pronged approach.
  - Find new clients.
  - Reduce costs.
  - Maximize value from byproducts

FINDING NEW CLIENTS

- Reaching out to hundreds of food and beverage manufacturers.
- Finding that industrial wastewater is an issue in many industries and municipalities.
- Many problems that we can help mitigate:
  - Phosphorus
  - Chlorides
  - High BOD



FINDING NEW CLIENTS (CONTINUED)

- Biggest potential is in discard consumer products.
  - Beer cans
  - Soda
  - Nacho cheese dip
- Installing a separator unit.
- Will be taking in discard beer as soon as this Fall.

REDUCING COSTS

- Minimizing surcharges and fines
- Finding the best chemical formulas.
- Challenges similar to many municipal wastewater treatment plants.

OBTAINING VALUE FROM BYPRODUCTS

- Finding markets for biosolids.
- Experimenting with commercial algae production.
- Selling salt as a road de-icer.
- Fueling wastewater hauling trucks with CNG?

WHAT WE HAVE LEARNED

- Key takeaway for anyone building an anaerobic digester: Secure feedstocks first
- Make sure your facility is:
  - Equipped to take in a wide range of waste products.
  - Designed for foul weather and the elements.
  - Centrally located.
- Expect the unexpected!

Want to learn more?

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