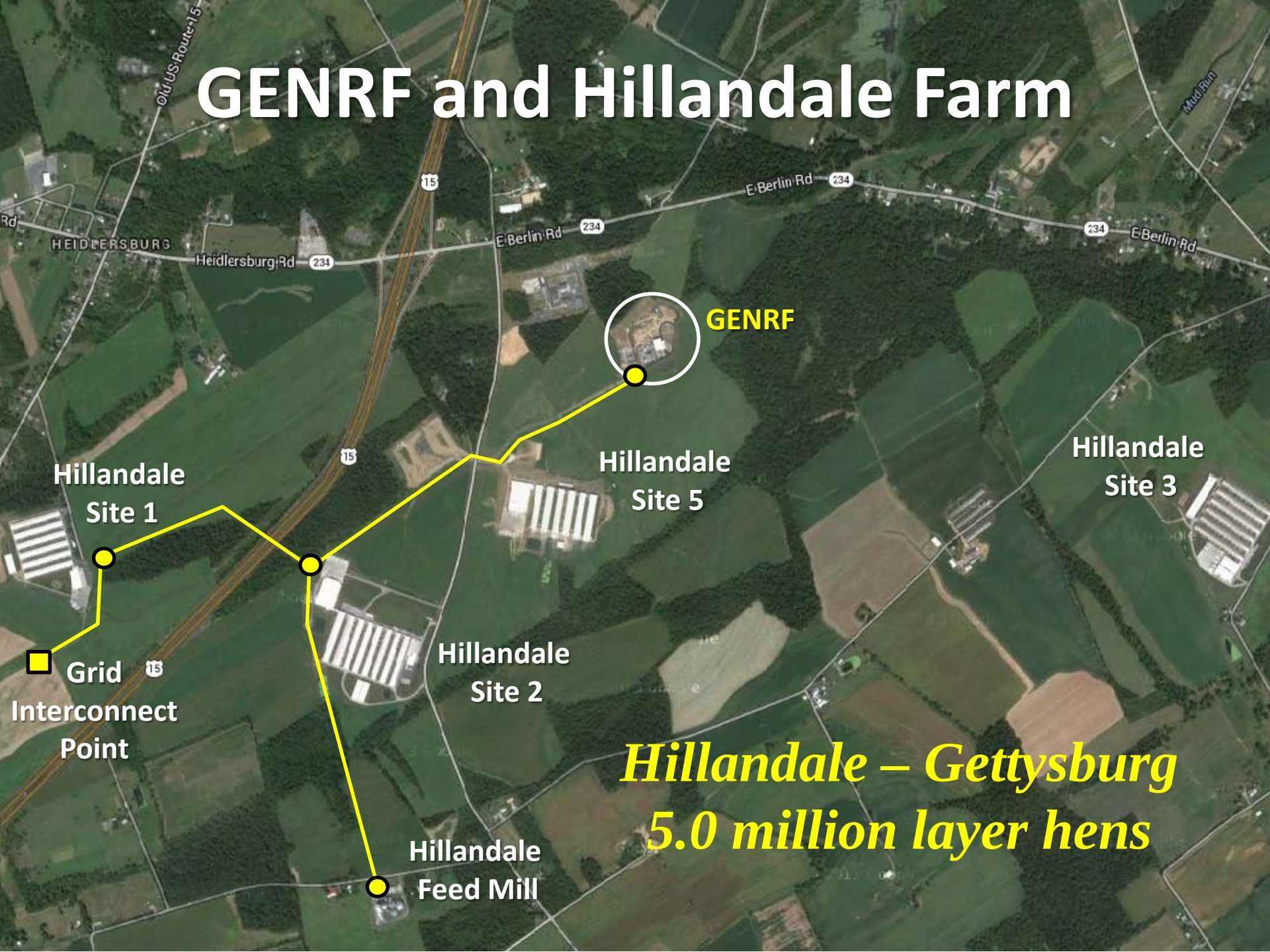
Gettysburg
Energy & Nutrient Recovery Facility
A Chesapeake Bay Water Quality Resource

Presented to
Chesapeake Bay Program Management Board
Annapolis, Maryland
November 21, 2013


GENRF and Hillandale Farm
GENRF
Hillandale Site 1
Hillandale Site 5
Hillandale Site 3
Hillandale Site 2
Grid Interconnect Point
Hillandale Feed Mill
Hillandale – Gettysburg
5.0 million layer hens
Old US Route 15
Heidlersburg Rd
E Berlin Rd
Mud Run

Farm Host Manure Storage

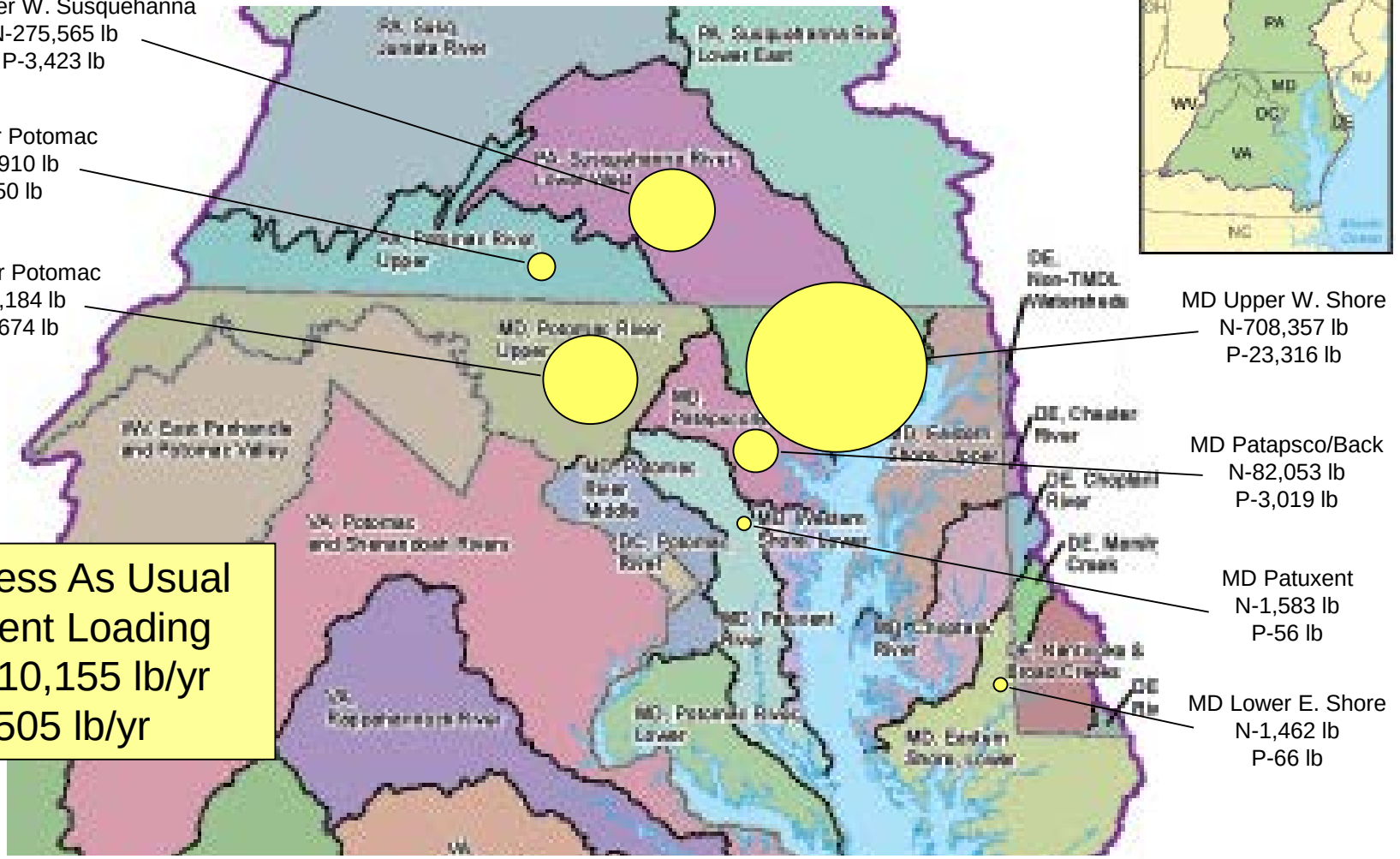
Typical Manure Storage Barn

Manure Supply

240 tons of egg layer manure produced daily

Business as Usual

Manure is exported to multiple basins



GENRF Highlights

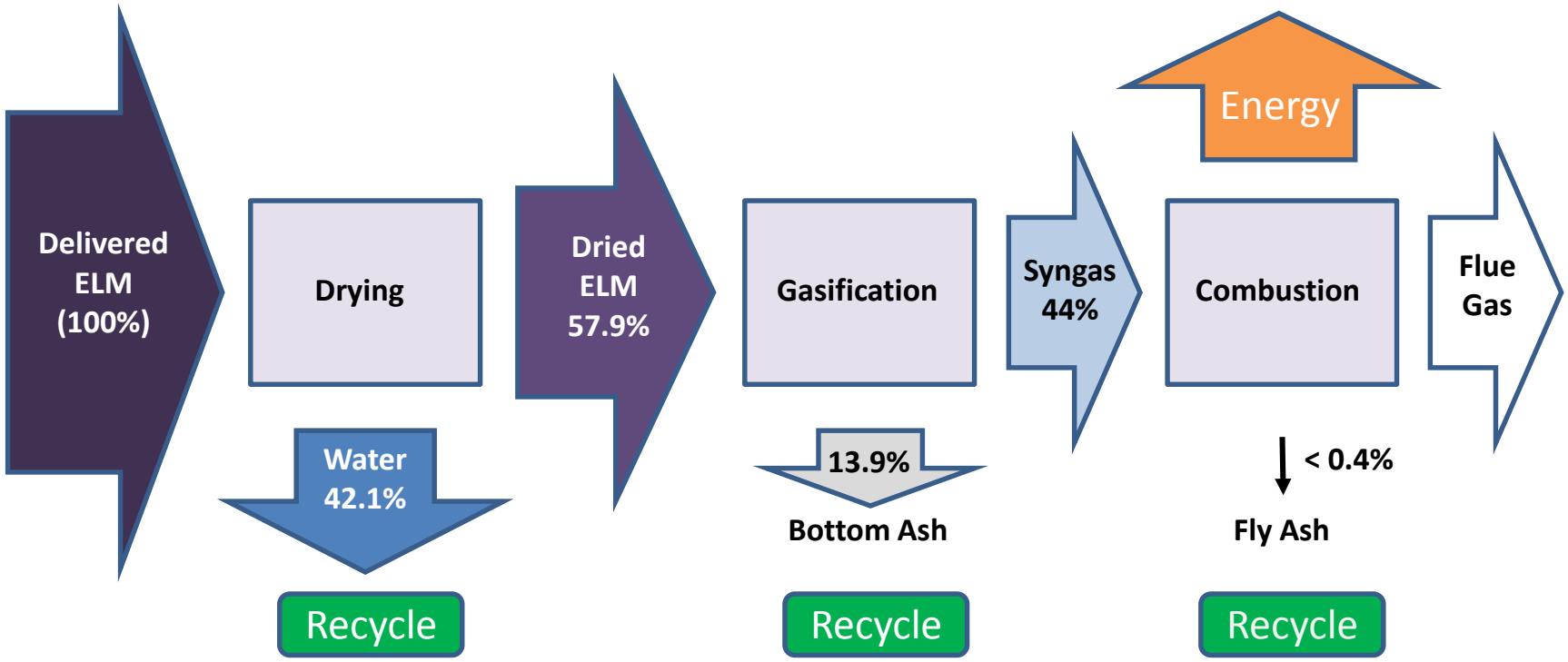
- Completion of Construction: January 2013
- Begin Commercial Operation: June 2013
- Feedstock: Egg Layer Manure (ELM) – no additives
- Throughput: 240 tons/day (expandable to 310 tons/day)
- Core Technologies:

1. Steam/Air Dryer	4. Steam Turbine Generator
2. Gasification/Thermal Oxidation	5. Air Cooled Condenser
3. Heat Recovery Boiler	6. Flue Gas Particulate Filtration

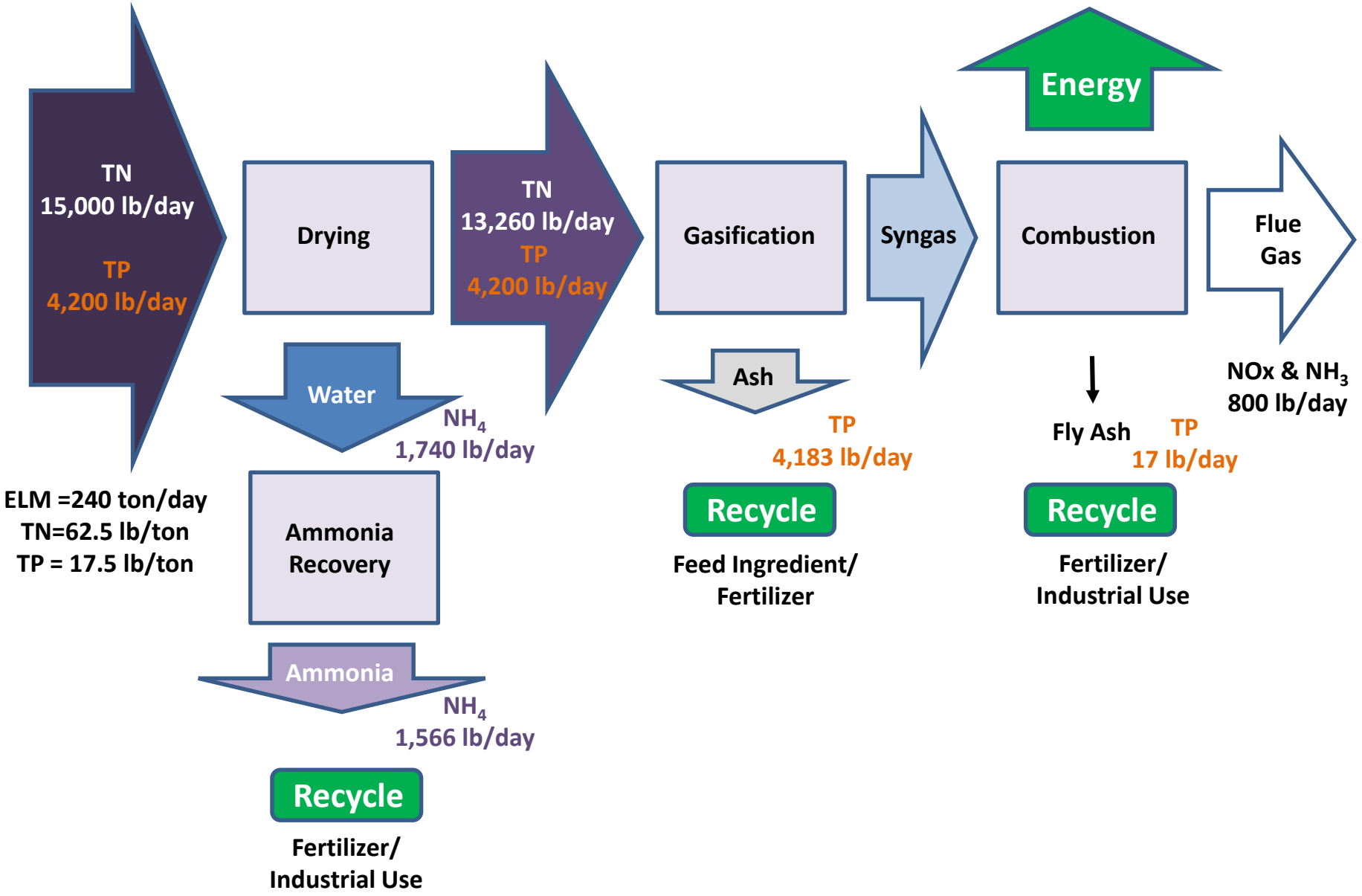
- Rated Electrical Output: 3,240 kw
- Mineral Product Recovery: 35 tons/day (expandable to 45 tons/day)
- Revenue Streams:
  - Electricity – Net Metering via Farm Host interconnection
  - Mineral Ingredient for Organic Fertilizers and Organic Animal Feeds
  - Certified/Verified Nutrient Trading Credits

GENRF Complete Utilization of Manure

A sustainable alternative to storage, hauling and land application

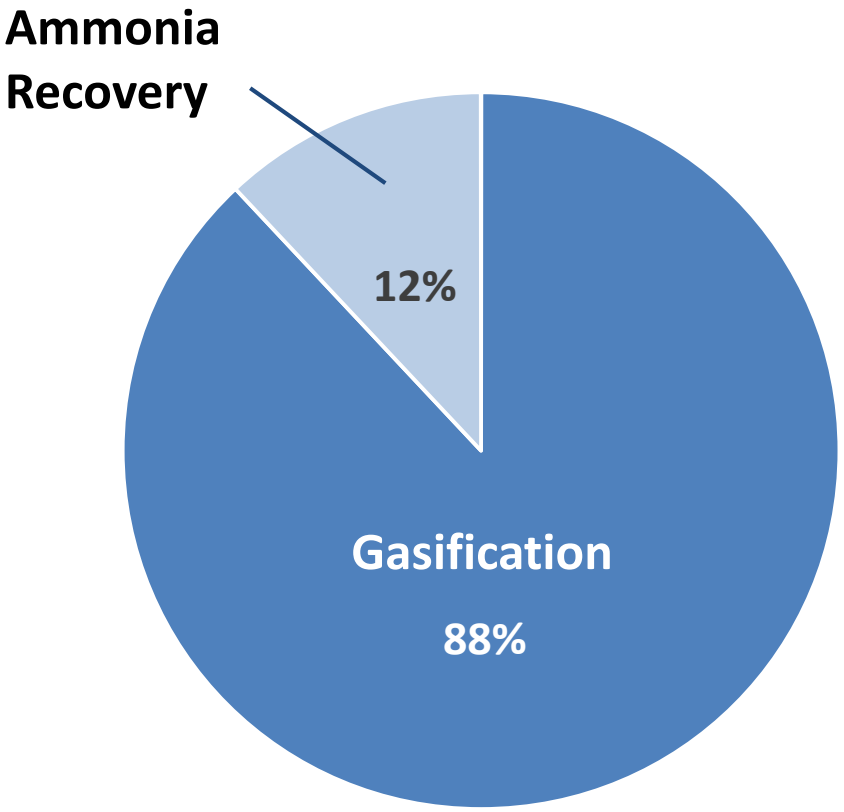


GENRF Nutrient Mass Balance



GENRF Nutrient Credit Generation

Gasification is the primary credit generator

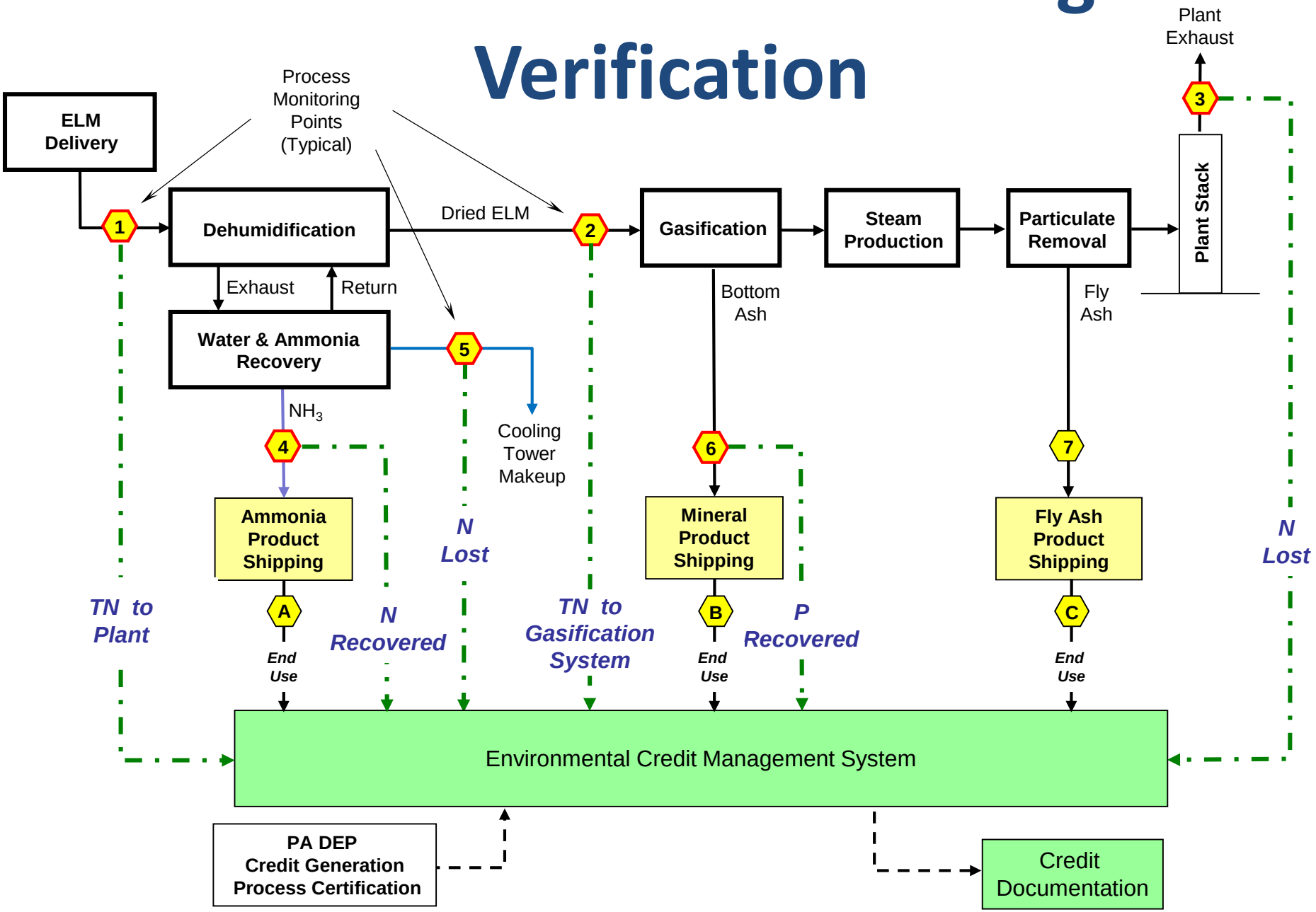


Note: Credit amounts are based on the current Pennsylvania process certification

Over 1 Million Nitrogen Credits

Over 23 Thousand Phosphorus Credits

Nutrient Credit Monitoring & Verification



Tradable Credits from Watershed Segment Mass Balance Model*

WS Mass Balance Credits	N Credits	P Credits
Total Projected Credits	1,168,411	26,111
10% Reserve	116,841	2,611
Total Tradable Credits	**1,051,570**	**23,500**
Susquehanna	***75.8%***	***70.3%***
Potomac	***24.2%***	***29.7%***

* Pennsylvania Nutrient Credit Generation Process Certification

Notes

1. The current Chesapeake Bay Model does not recognize technology-based credit generators
2. EnergyWorks offers the GENRF as the first “manure technology” for review by the EPA CB Program Office

GENRF As A Regional Resource

- A new facility class, conceived and implemented as an *ecosystems services resource*
- Employs state-of-the-art technologies
- Capable of removing significant quantities of pollutants from the environment
- Provides a unique opportunity for education and research
  - Enhance data on manure quantities and characteristics
  - Pollutant conversion efficiencies
  - Air quality control features
  - Exploration of solids and liquids byproduct recycling
  - Resolve modeling uncertainties
  - Evaluate scalability and replicability