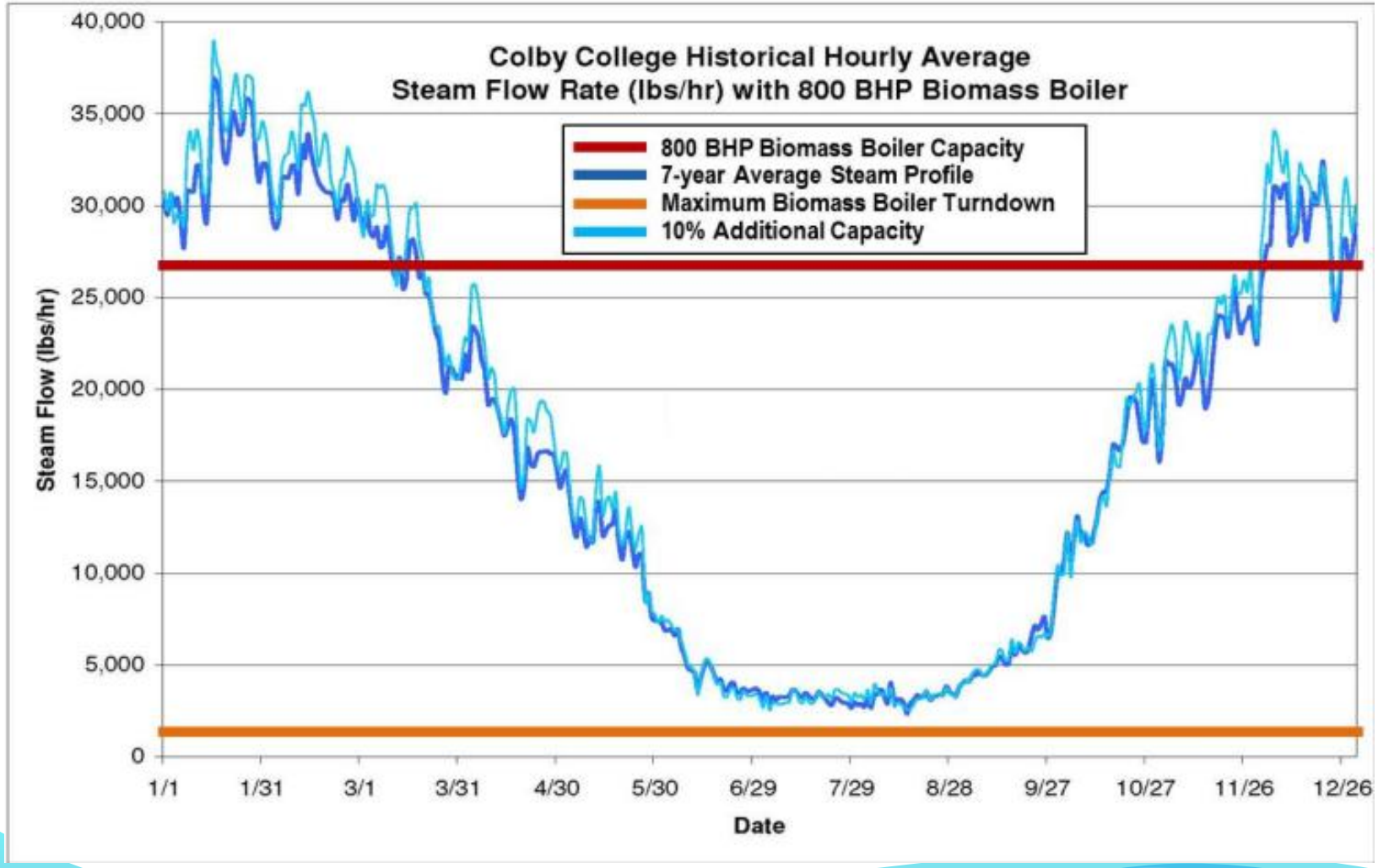
Colby Biomass Facility

- Planning started in 2006
- First boiler on line in 2011
- Energy Source approx. 80% Biomass
- Natural Gas only for Peak-Shaving and Back-up
- Full Integration w/Back-Pressure cogeneration Turbine

Colby Biomass Faciltiy

Early Analysis: Campus Load & Biomass Capacity



Colby Biomass Facility

Fuel Source

CHIPS

- Quality Control Challenges
- High Storage Volume Required
- Complex Material Handling
- Large Footprint for Boilers, etc.
- Locally Sourced Forest Waste
- $50/ton = $6/MMBtu Output

PELLETS

- Extremely Uniform
- More Energy Per Volumetric Unit
- Fuel Delivery Most Like Traditional
- Modular Boilers Possible
- Manufactured Product
- $250/ton = $15/MMBtu Output

Colby Biomass Facility

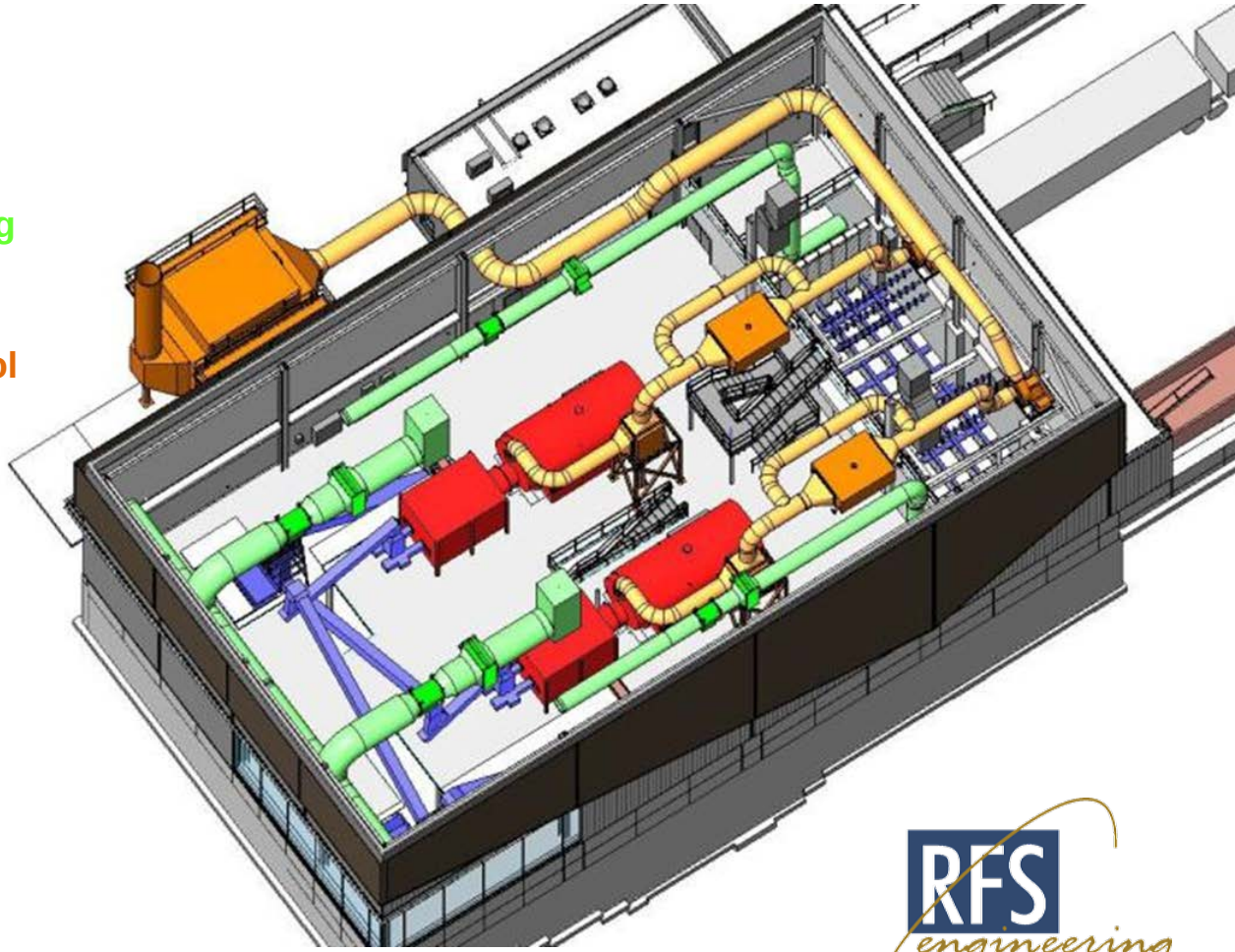
Fuel Supply

- Identify Suppliers
  - Selected a “Broker”
- Specify Fuel Quality
  - Whole Tree and Bole Chips
  - Moisture Content: 45%
  - Size: 1/8” x 1/8” to 2½” x 2½”
  - Non-standard: Sticks and Branches <5%
- Specify Delivery Parameters
  - Year-round Stockpile
  - 50-mile Radius
  - Sustainable Foresting Practices (4 Options)

Colby Biomass Facility

Five Subsystems

- Fuel Storage and Handling
- Combustion Air and Fuel Drying
- Fuel Combustion
- Breeching and Pollution Control
- Ash Handling and Disposal



RFS engineering

Colby Biomass Facility

Pollution Control

Cyclonic Dust Collector

Electrostatic Precipitator

RFS engineering

Colby Biomass Facility

Summary

- Total project cost $11.25M
  - ❑ $750,000 Efficiency Maine Grant
- Provides secondary source of fuel
- Experiencing higher efficiency decreasing wood use. More down time for cleaning requiring more gas use
- Carbon emissions down by 9,500 - 13,700 tons/year
- During FY14, replaced approximately 900,000 gallons of oil, or 135,000 Dth NG, with biomass fuel
  - ❑ Total savings over $1.5 million annually
  - ❑ Estimated 5- to 8-year payback
- Provides long-term regional economic benefits
- USGBC LEED® Gold Certification