

# Wood Energy in the Northeast: Project Development Process

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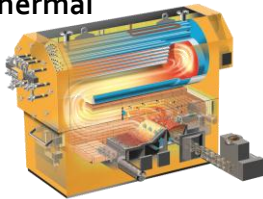


## Overview

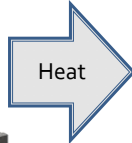
- Projects covered, thermal & thermally-led CHP
- General steps
- Details for each step
- Thoughts on the overall process

# Biomass thermal & thermally-led CHP

## Thermal

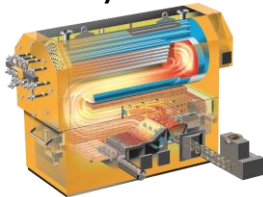


Advanced Biomass Combustion Unit



- Designed to use biomass for replacing fossil fuel use in heating applications
- Where cost effective, generate electricity as a bonus

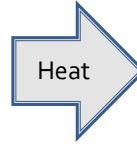
## Thermally-led CHP



Advanced Biomass Combustion Unit



Turbine or Engine (ORC, Steam)



# Typical process flow



Storage



Combustion Unit/Boiler



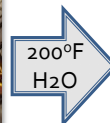
turbine/generator



Steam to hot water heat exchanger



6,000 gallons thermal storage



HX and Distribution Pumps to three facilities

## What do these projects entail?

- Housing for fuel storage and combustion system
- Fuel handling equipment
- Combustion unit/boiler or heater
- Emission control
- Interconnect to heat load
- Backup fossil fuel boilers
- Electric generation / interconnect

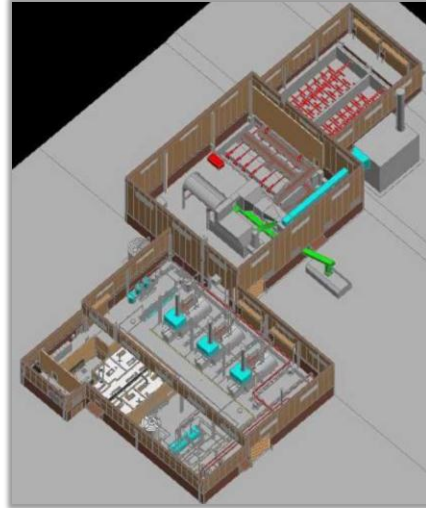
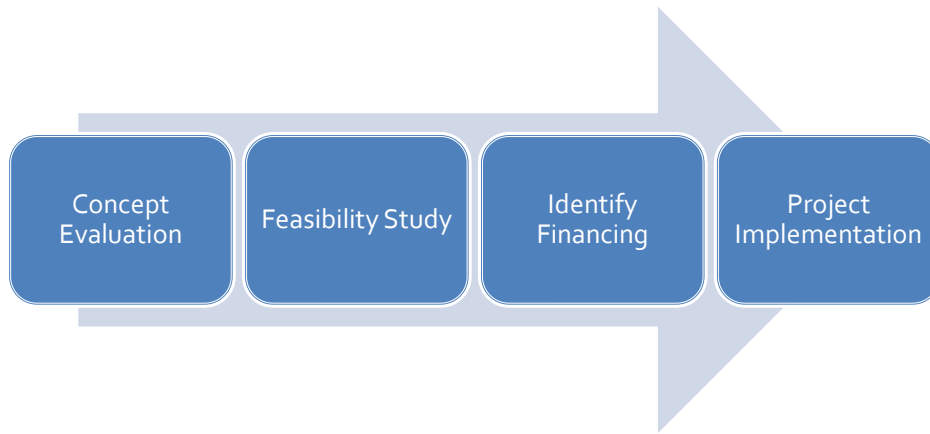


Image Source: IDEA 2011 – Woolpert Presentation

## General Steps

- Biomass thermal/CHP in the \$1-\$10 M range



## Concept Evaluation

- Goal is to identify:
  - General economics
  - Obvious fatal-flaws
  - Options to study in detail
  
- Varying levels of effort depending on complexity
  - Back of napkin
  - Preliminary feasibility study

## Feasibility Study

- Project investigations
  - Owner goals
  - Modeling of thermal/electrical demands
  - Site investigations (geotechnical, surveys, etc.)
  
- Option evaluation (based on investigations)
  - Equipment, construction methods, costs, schedule, permitting, funding opportunities, economics
  
- **Allows owner to make investment decisions and seek financing**

## Financing Options

- Direct financing
  - Capital budget
  - Municipal bond
  - Loan
  - Federal / State government loans and grants
- Debt guaranteed by savings
  - Performance contracting
  - Leasing

## Project Implementation

- Design, permitting, construction, commissioning/ closeout
- Typical Options
  - Design – Bid – Build
  - Design – Build
  - Performance contracting
  - Hybrids

## Design-Bid-Build

- Hire architect or engineering firm to perform design, permitting, and develop bid documents
- Competitively bid construction and commissioning
- Minimum of two contracts for owner

## Design-Build

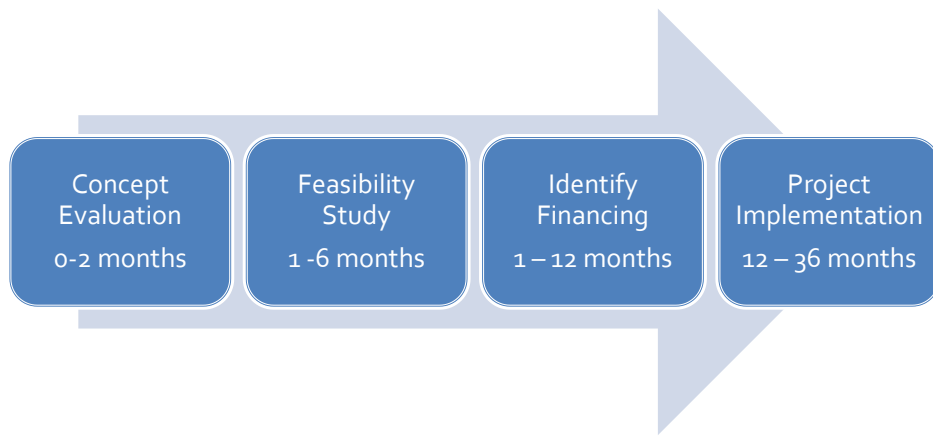
- Hire a single firm to design, permit, construct, and commission the project
- Single point of responsibility
- Key is to clearly define project in contract

## Performance contracting

- Hire a performance contractor
  - Provides design-build service
  - Guarantees energy savings
- Often performance contractors have contracts with owners starting in the feasibility study phase or earlier

## Timeline

- Biomass thermal/CHP in the \$1-\$10 M range



## Thoughts on the process

- A concept evaluation can save you wasted time and expense
- A detailed feasibility study or pre-feasibility study is very helpful if you plan to apply for grants

## Thoughts on the process

- Selection of the project implementation path is based on the owner's in-house capabilities and staff availability
- In order of least owner effort
  - Performance contracting
  - Design-Build
  - Design-Bid-Build



## Thoughts on the process

- For any contract, developing a detailed scope of work is critical to obtaining the desired outcome
- Owner's most effective time spent is upfront in clearly defining the project / scope of work

