

# Thermal Biomass Heating for Smaller Projects

What Architects / Engineers & Contractors Should Know

April 30, 2014

**Daryl J. Dean, AIA**

Architect / LEED AP<sup>BD+C</sup>



USDA Forest Service  
Eastern Region Technical Services Team



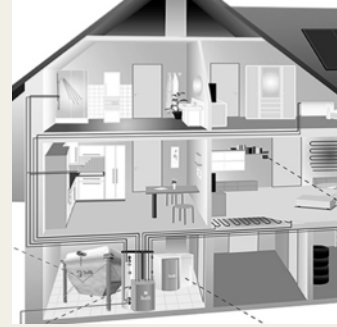
# Thermal Biomass Heating For Smaller Projects

## Objectives & Outcomes:

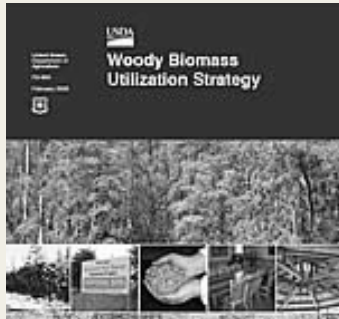
Plan



Design

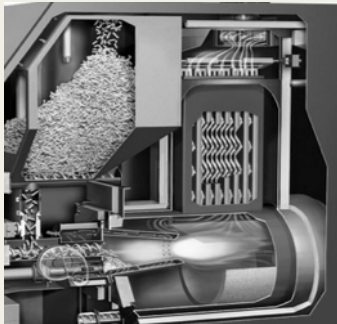


Research



Regulations  
(Analyze)

Benefits  
(Identify)



Apply



# Thermal Biomass Heating For Smaller Projects

## Objectives & Outcomes:

Plan



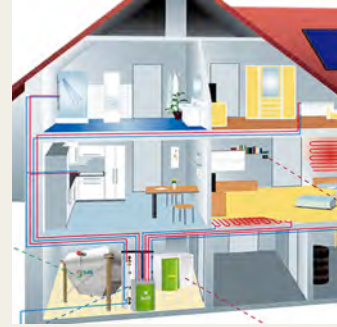
# Thermal Biomass Heating For Smaller Projects

## Objectives & Outcomes:

Plan



Design



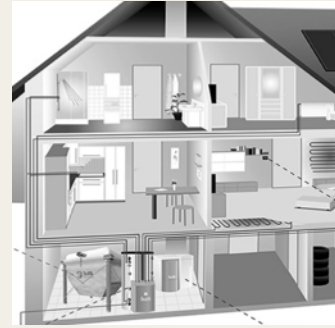
# Thermal Biomass Heating For Smaller Projects

## Objectives & Outcomes:

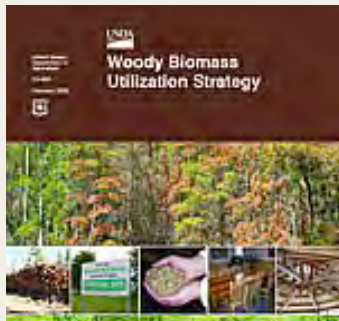
Planning



Design



Research



# Thermal Biomass Heating For Smaller Projects

## Objectives & Outcomes:

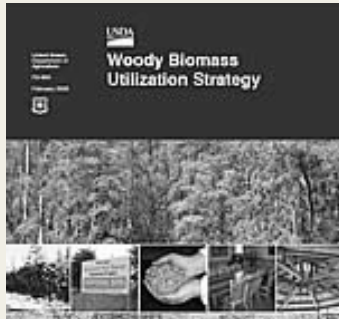
Planning



Design



Research



Regulations  
(Analyze)

# Thermal Biomass Heating For Smaller Projects

## Objectives & Outcomes:

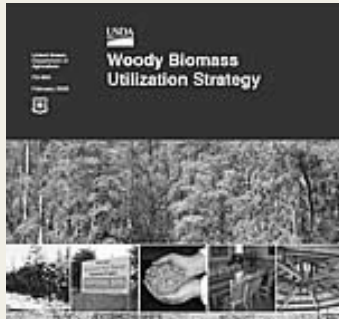
Plan



Design



Research



Regulations  
(Analyze)

Benefits  
(Identify)



# Thermal Biomass Heating For Smaller Projects

## Objectives & Outcomes:

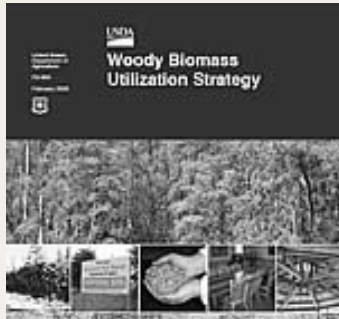
Plan



Design

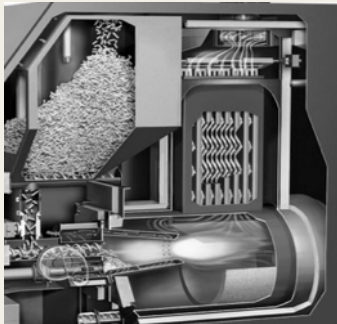


Research



Regulations  
(Analyze)

Benefits  
(Identify)



Apply





# Thermal Biomass Heating For Smaller Projects

## Background & Importance of the Role of the Architect/Engineer & Contractor:

Plan



Small Project  
Size  
Complexity  
Location

Listen  
Question  
Alternatives  
Recommend  
Decide

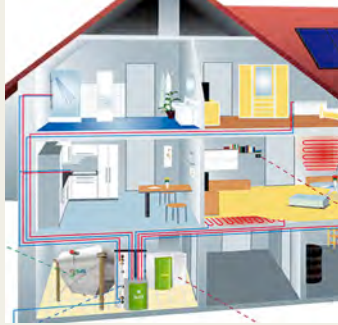
Guide  
Lead  
Consult  
Counsel

Reduce  
Energy Costs  
Lower  
Carbon  
Emissions

# Thermal Biomass Heating For Smaller Projects

Innovate & Evaluate:

Design



Size  
Quality  
Quantity  
Cost

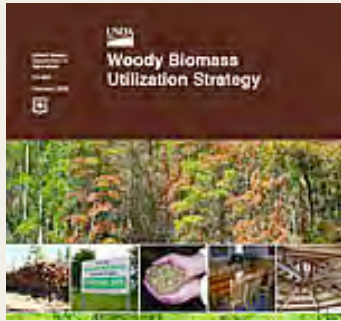
Opportunity  
Desires  
Needs  
Fit

Research  
Calculate  
Model  
Specify

Design

# Thermal Biomass Heating For Smaller Projects

Investigate & Discover:



Research

Reliable  
Information  
on Systems &  
Safety

Credible  
Information  
on Design,  
Performance  
& Operations

Consistent  
Testing &  
Reporting

Uniform  
Thermal  
Output  
Metrics

# Thermal Biomass Heating For Smaller Projects

Need to Know or Find Out:



Regulations  
(Analyze)

Agencies  
Federal  
State  
Local

Laws  
Codes  
Ordinances  
Standards  
Guidelines

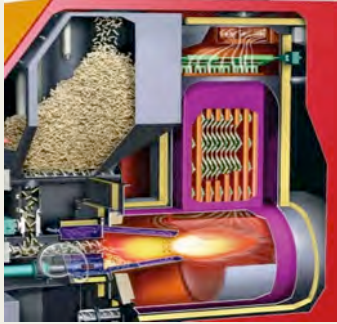
Agreements  
Permits  
Resource  
Management

Seasonal  
Burn Bans  
Fuels &  
Equipment  
Standards

# Thermal Biomass Heating For Smaller Projects

## Why Wood Heat:

### Benefits (Identify)



Economic  
Cost Saving  
Local Source  
Efficient

Eco-Friendly  
Renewable  
Carbon  
Neutral

Cleaner  
Hotter  
Embodied  
Energy

Forest Fire  
Fuels  
Reduction

# Thermal Biomass Heating For Smaller Projects

Integrate & Incorporate:

Apply



Chippewa  
N.F.

White  
Mountain  
N.F.

Efficient  
Reliable  
Local  
Message

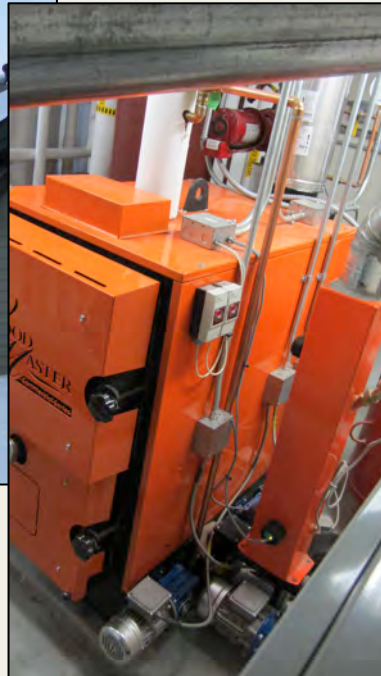
Cost  
Availability  
Convenience

# Thermal Biomass Heating For Smaller Projects

Installation: Walker Ranger District Office  
Walker, Minnesota



20 Ton Pellet Silo  
Automatic Auger Feed



200,000 BTU – 90%  
Efficient Pellet Boiler

Automatic Ash Removal

Self Igniting

Auto On/Off

# Thermal Biomass Heating For Smaller Projects

Installation: White Mountain National Forest Supervisor's Office  
Campton, New Hampshire



40 Ton Pellet Silo w/  
Automatic Auger Feed to a  
4 Ton Day Bin/Hopper inside



1 Million BTU - 90% Efficient  
3 Pass Gasification Pellet Boiler



Automated Pellet Delivery and  
Ash Removal



# Thermal Biomass Heating For Smaller Projects

Conclude / Summarize: *What Architects / Engineers & Contractors Should Know*

## Plan

Inquire & Observe  
Evaluate Alternatives  
Council Decisions

## Design

Explore & Investigate  
Design Alternatives to  
Determine Plan that  
Represents Decisions

## Research

Appraise & Verify  
Credible, Reliable  
Information on System  
Performance

## Regulations (Analyze)

Formulate & Interpret  
Existing Regulations  
Translate & Incorporate  
Into Design Plan

## Benefits (Identify)

Identify, Evaluate &  
Conclude Advantageous  
Alternatives for Project

## Apply

Integrate & Incorporate  
Alternatives Into Construction  
w/ Measurement &  
Verification



# Thank You

Daryl J. Dean, AIA  
Architect / LEED AP<sup>BD+C</sup>  
[ddean@fs.fed.us](mailto:ddean@fs.fed.us)  
715-362-1360



THE AMERICAN INSTITUTE  
OF ARCHITECTS

