Thermal Biomass Heating for Smaller Projects

What Architects / Engineers & Contractors Should Know

April 30, 2014

Daryl J. Dean, AIA
Architect / LEED AP BD+C

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
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)**

Daryl J. Dean, AIA
Architect / LEED APBD+C
Thermal Biomass Heating For Smaller Projects

Objectives & Outcomes:

- Plan
- Design
- Research
- Regulations (Analyze)
- Benefits (Identify)

Daryl J. Dean, AIA
Architect / LEED AP BD+C
Thermal Biomass Heating For Smaller Projects

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

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

Daryl J. Dean, AIA
Architect / LEED APBD+C
Thermal Biomass Heating For Smaller Projects

Investigate & Discover:

- Reliable Information on Systems & Safety
- Credible Information on Design, Performance & Operations
- Consistent Testing & Reporting
- Uniform Thermal Output Metrics

Daryl J. Dean, AIA
Architect / LEED AP BD+C
Thermal Biomass Heating For Smaller Projects

Need to Know or Find Out:

- Agencies
  - Federal
  - State
  - Local
- Regulations (Analyze)
- 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
- Cleaner Hotter
- Embodied Energy
- Forest Fire Fuels Reduction
- Eco-Friendly Renewable Carbon Neutral

Daryl J. Dean, AIA
Architect / LEED AP BD+C
Thermal Biomass Heating For Smaller Projects

Integrate & Incorporate:

Chippewa N.F.  White Mountain N.F.  Efficient Reliable Local Message  Cost Availability Convenience

Daryl J. Dean, AIA
Architect / LEED AP BD+C
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*

<table>
<thead>
<tr>
<th>Plan</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquire &amp; Observe</td>
<td>Explore &amp; Investigate</td>
</tr>
<tr>
<td>Evaluate Alternatives</td>
<td>Design Alternatives to</td>
</tr>
<tr>
<td>Council Decisions</td>
<td>Determine Plan that</td>
</tr>
<tr>
<td></td>
<td>Represents Decisions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research</th>
<th>Regulations (Analyze)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appraise &amp; Verify</td>
<td>Formulate &amp; Interpret</td>
</tr>
<tr>
<td>Credible, Reliable</td>
<td>Existing Regulations</td>
</tr>
<tr>
<td>Information on System</td>
<td>Translate &amp; Incorporate</td>
</tr>
<tr>
<td>Performance</td>
<td>Into Design Plan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefits (Identify)</th>
<th>Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify, Evaluate &amp;</td>
<td>Integrate &amp; Incorporate</td>
</tr>
<tr>
<td>Conclude Advantageous</td>
<td>Alternatives Into Construction</td>
</tr>
<tr>
<td>Alternatives for</td>
<td>w/ Measurement &amp; Verification</td>
</tr>
<tr>
<td>Project</td>
<td></td>
</tr>
</tbody>
</table>

---

Daryl J. Dean, AIA
Architect / LEED APBD+C
Thank You

Daryl J. Dean, AIA
Architect / LEED AP BD+C

ddean@fs.fed.us
715-362-1360