



**Biomass Project Development**  
**2014 Western Idaho Biomass Energy Workshop**  
**July 29, 2014**

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# Discussion Points

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What makes a viable Project?

Feasibility Analysis

Project Management

Financing

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# Background

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✓ PES was formed in 1993 as a Biomass Technical Services and O&M contract operator.



✓ PES offers services to Industrial Energy Users and the IPP Industry in all aspects of thermal fuel based energy and electrical power production. PES has provided services from Turnkey Plant installations through Operation and Maintenance for 20 years



# Background

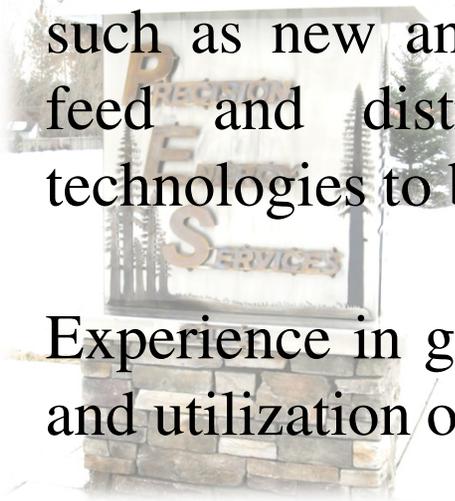
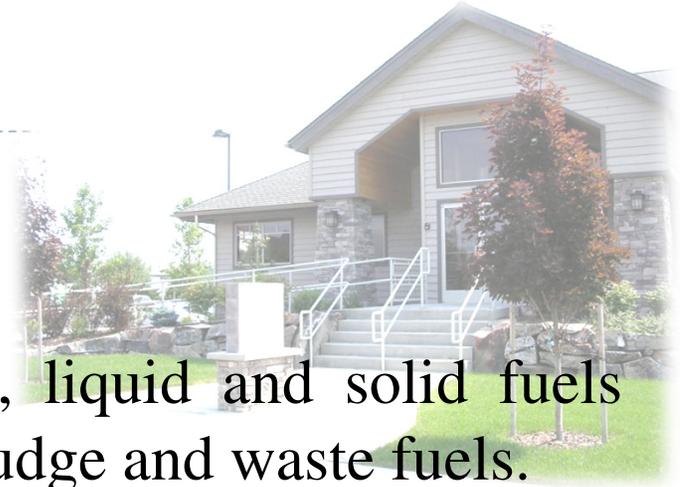
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## Combustion/Gasification

Expertise in the combustion of gaseous, liquid and solid fuels including difficult to burn fuels such as sludge and waste fuels.

Experience in improving combustion with advanced techniques such as new and modified over-fire air systems, improved fuel feed and distribution and modifying existing combustion technologies to be compatible with new fuels.

Experience in gasification technologies including the combustion and utilization of low-Btu gas from various source fuels.



# Background

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## Boiler Systems

PES provides new, modifications and re-design services for:  
Units burning wood, biomass, sludge, coal, fossil fuels and natural gas.

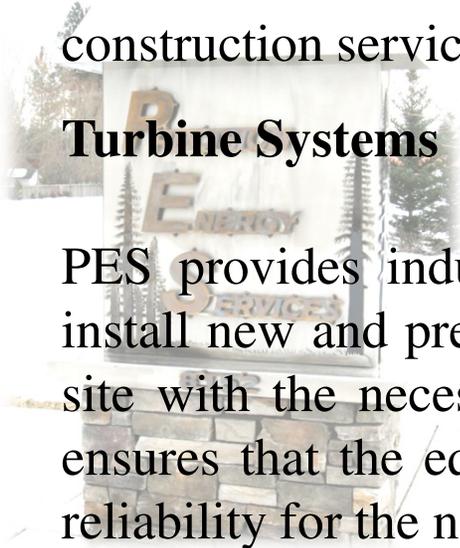
Co-Generation units up to 50MWe

Projects anywhere in the nation

PES is a licensed General Contractor that offers engineering, procurement and construction services.

## Turbine Systems

PES provides industrial and utility plants with the resources to re-build or install new and pre-owned turbine/generators. These services are generally on-site with the necessary components being shipped to specialized shops. This ensures that the equipment will be carefully and precisely rebuilt to maintain reliability for the necessary run-time without unforeseen problems.



# What makes a viable project?

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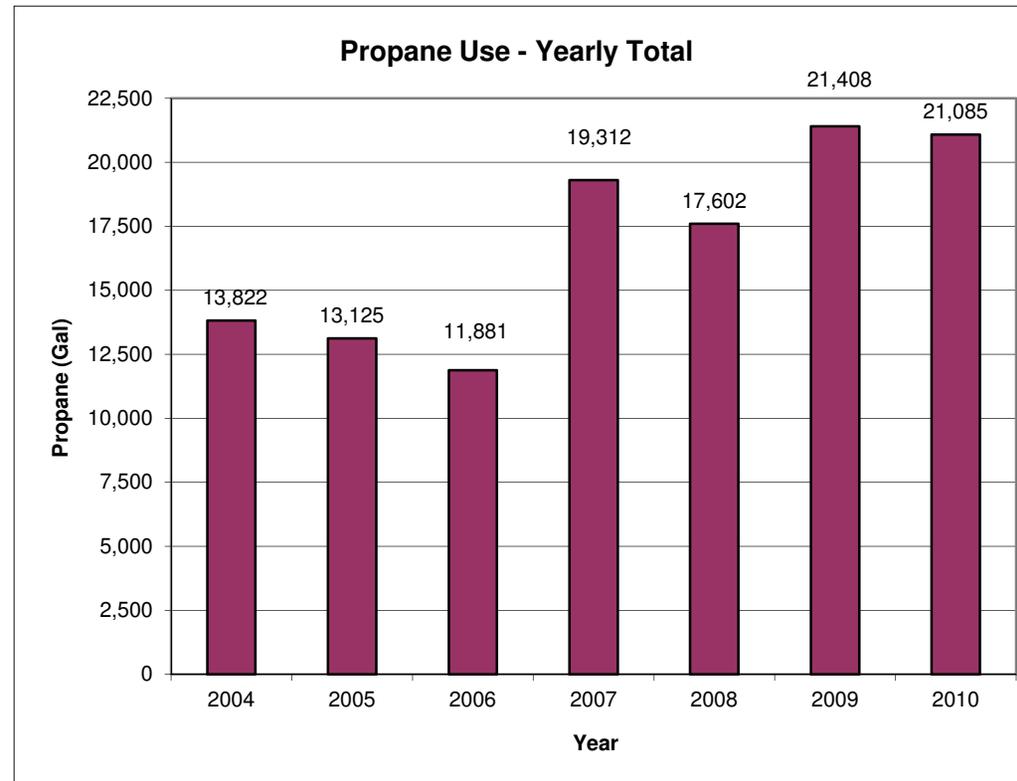
- 1. Energy Demand**
- 2. Fuel Economics & Availability**
- 3. Ownership**
- 4. Feasibility Study**
- 5. Financing & Cash Flow**
- 6. Engineering Design & Management**
- 7. Construction**
- 8. Startup & Commissioning**
- 9. Good Owner Management of the System & Fuel Supply.**



# What makes a viable project?

## Energy Demand:

- A sizeable demand for energy (heating and/or cooling).
  - A year-round energy load will pay back faster than just a seasonal demand.
- Energy Use History
  - More accurate average
- How is the energy being used?
  - Steam & Condensate
  - Hot & Chilled Water
  - Electric Resistance Coils
  - Direct Duct firing



# What makes a viable project?

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## Fuel Economics & Availability:

- Current or expected high fuel prices. (Fuel oil, propane, electricity)
- Local suitable wood fuel supply (<100 mile radius), the closer, the better.
- Apples to Apples Fuel Cost comparison.(price, efficiency, into same units)
- Energy Cost of Output in \$/Million BTU.

Fuel Cost Comparison				
Heat Source	unit	Fuel Cost	Efficiency	Output Cost
		\$/unit	%	\$/mmbtu
No.2 Oil	Gal	\$ 4.00	80%	\$ 36.40
Propane	Gal	\$ 1.90	80%	\$ 25.98
Electricity	kw-h	\$ 0.09	100%	\$ 24.92
Natural Gas	Mcf	\$ 9.00	80%	\$ 10.42
Pellets	Tons	\$ 130.00	78.75%	\$ 10.41
Coal	Tons	\$ 120.00	60%	\$ 9.70
Bulk Chips (Green)	Tons	\$ 40.00	63.00%	\$ 7.94

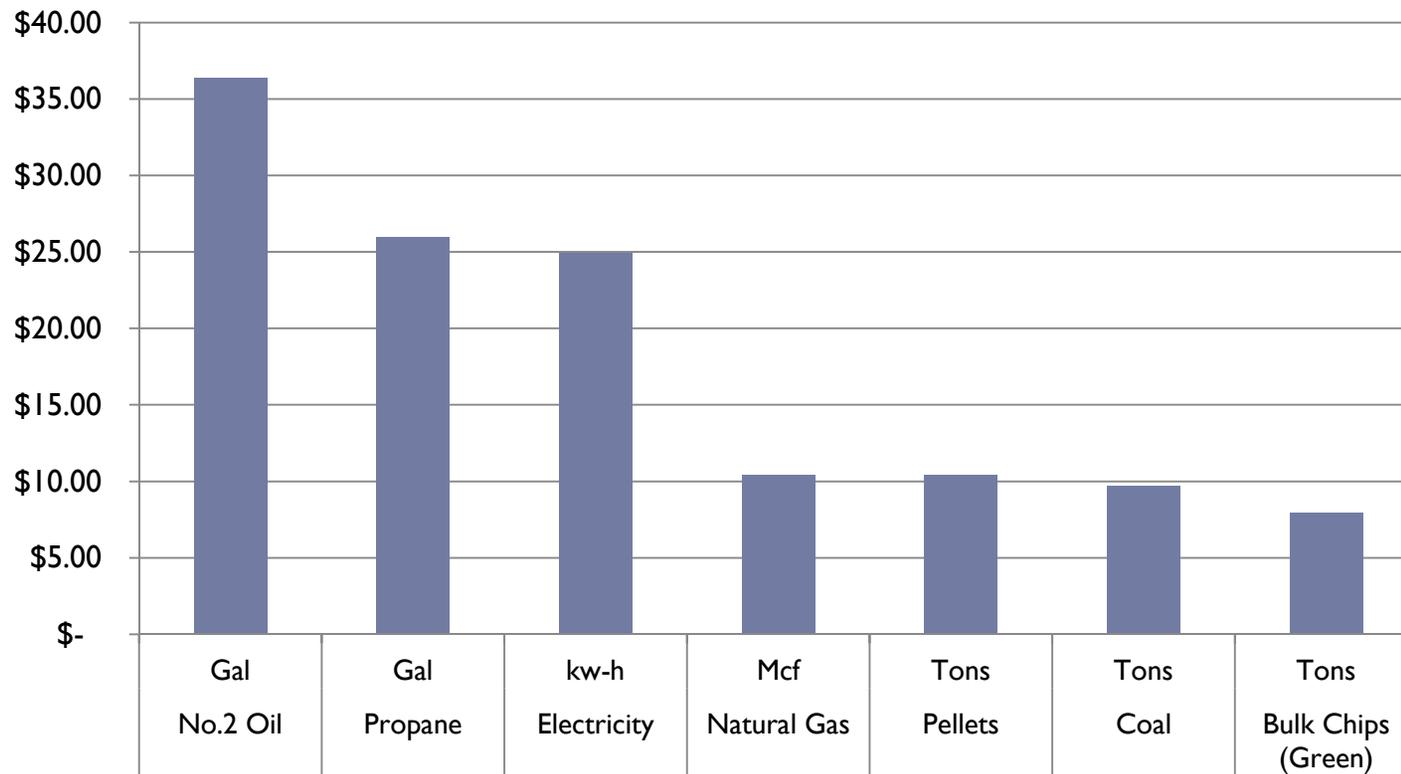


# What makes a viable project?

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## Fuel Economics & Availability:

### FUEL COST COMPARISON GRAPH



# What makes a viable project?

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## **Ownership:**

- Advocate to see the project through
- Owner with vested interest to make project succeed.
- Keep the ball rolling, project momentum is key.
- Good projects can fade away because of lack of ownership.
- Owner/operator should have decision making power during design phase.



## **What makes a viable project?**

- A sizeable energy requirement that is being supplied by fossil fuels or electricity.
- An energy demand over an extended time frame of many months or annually.
- A current fuel that is high cost such as oil, propane, or electricity.
- A reliable biomass fuel source that is substantially lower in cost per Million BTU than the currently energy used.



## **What makes a viable project?**

- A facility that has physical space for a biomass system
- A facility that has minimum conversion cost, has an existing boiler, hot water, hot air systems.
- Managements comment to the use of a solid fuel.
- A cost savings that provides an acceptable return on the investment made considering loans, grants, tax credits and additional operational cost.



## Feasibility Analysis

Elements:

- Energy cost and usage records for 2 to 3 prior years.
- Evaluation of amount of energy replaceable, 90% of peak.
- Biomass source(s), types, specifications and cost.
- Determination of biomass system size, scope, estimated capital cost.
- Operational costs fuel, electricity, O&M, labor, ash disposal
- Source of Funds, cash, debt, grants, energy credits, tax credits
- Pro forma economic evaluation for “what if cases” on project



## Project Management

- Owner's resources available for management of project, PR, Technical, Financial, Interface, etc.
- Fuel sources defined and contracted "It is all about the fuel"
- Options for project execution:
  - Plans & Spec's
  - EPC , Engineer, Procure, construct
  - Performance Contact
- Defined scope of work and complete list of what is not within the scope of the project.
- Low bids are not necessarily the best for the project.



## **Financing**

- Owner's resources for funding project, equity and debt.
- Green Energy Grants, low interest "Renewable" funding.
- Tax credits direct use or monetized. Section 29 (expired example)
- Fuel purchase support, grants etc.

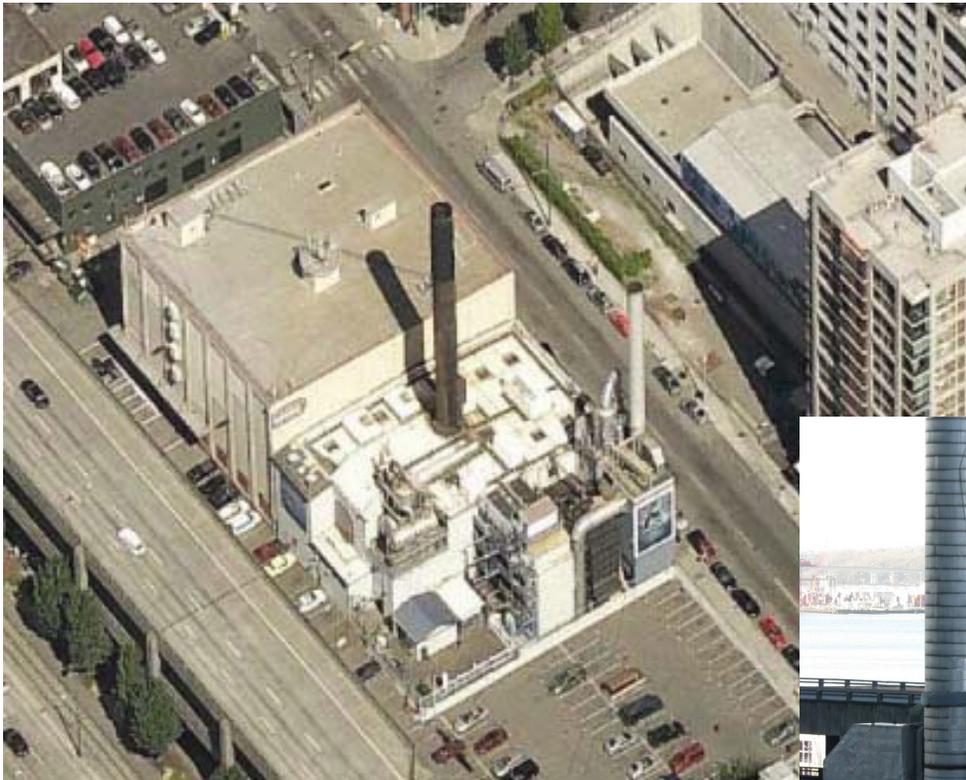


# Relevant Experience

## Boiler Installation

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- ▶ Seattle Steam Boiler Installation



# Relevant Experience Boiler Installation

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- ▶ **Seattle Steam Boiler Installation**



# Relevant Experience

## CHP Tri Generation System

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- ▶ Veterans Administration Medical Center - Vermont



# Design and Provide CHP Tri Generation System

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- ▶ Veterans Administration Medical Center - Vermont



# Small System EPC Installation

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- ▶ Mineral Community Hospital
- ▶ Superior, Montana



# Small System EPC Installation

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# Questions



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[www.PES-world.com](http://www.PES-world.com)