2014 Eastern Idaho Biomass Energy Workshop

Lost Trail Ski Resort
June 17, 2014

Sustainable Northwest

Targeted Biomass Conversion Sites
Eastern Idaho

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Sustainable Northwest

Sustainable Northwest

Partner with rural communities and businesses to achieve economic, ecological, and rural community vitality and resilience

Energy

Support the growth of a clean energy economy by inspiring new ideas, alliances, and tangible community-scale results that foster energy independence, reduce carbon emissions, improve landscape health and create jobs.

Overview

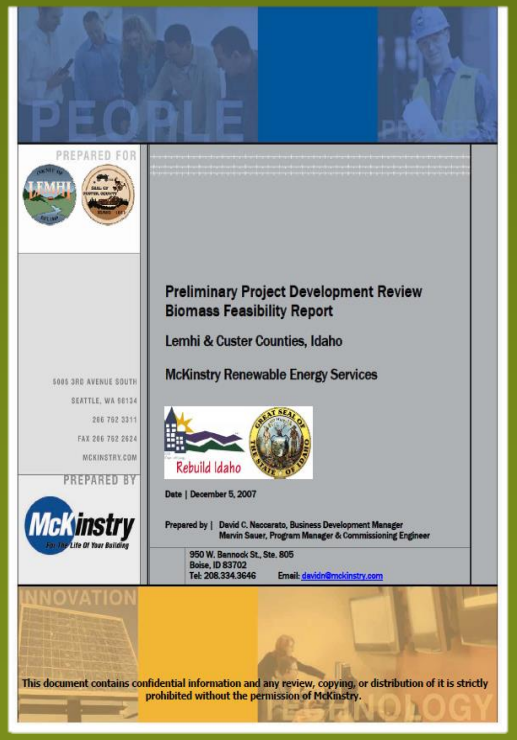
- 2007 McKinstry Preliminary Biomass Feasibility Report
- Best candidates profiles
- App interaction for Challis School
- Barriers
- Opportunities
- Next Steps

McKinstry Biomass Report (2007)

Lemhi County Economic Development Association

Summary of biomass opportunities for Lemhi and Custer County

"Biomass is an enormous regional resource that is abundant, clean and renewable. It provides rural communities an abundant, clean, sustainable and affordable means to heat facilities and provide…economic growth."



Best Opportunities *(To date)*

- Salmon High School biomass boiler
- Combined boiler for Challis High & Elementary Schools
- Lost Trail Ski Area Combined Heat & Power

Salmon High School

- Built in 1978, 70,000 sq. ft. building
- Closed hydronic loop provides heating & cooling
- Hydronic system good for biomass
- Require 55 tons pellets/90-100 tons chips annually
- Good to excellent projected savings

Challis High & Elementary School

- HS built 1983, 67,950 sq. ft.
- ES built in 1966, addition in 1981
- Electric boiler, closed loop for cooling
- HS 740,000 kWh + ES 360,000 kWh
- Single shared boiler using hydronic loop
- Reasonable payback with shared system

Lost Trail Ski Area

- Lodge area 20,000 sq. ft.
- Diesel generator with diesel backup
- Uses 12,000 gallons annually
- Heat & power needs
- Existing contract with Forest Service for area trail maintenance

Biomass App

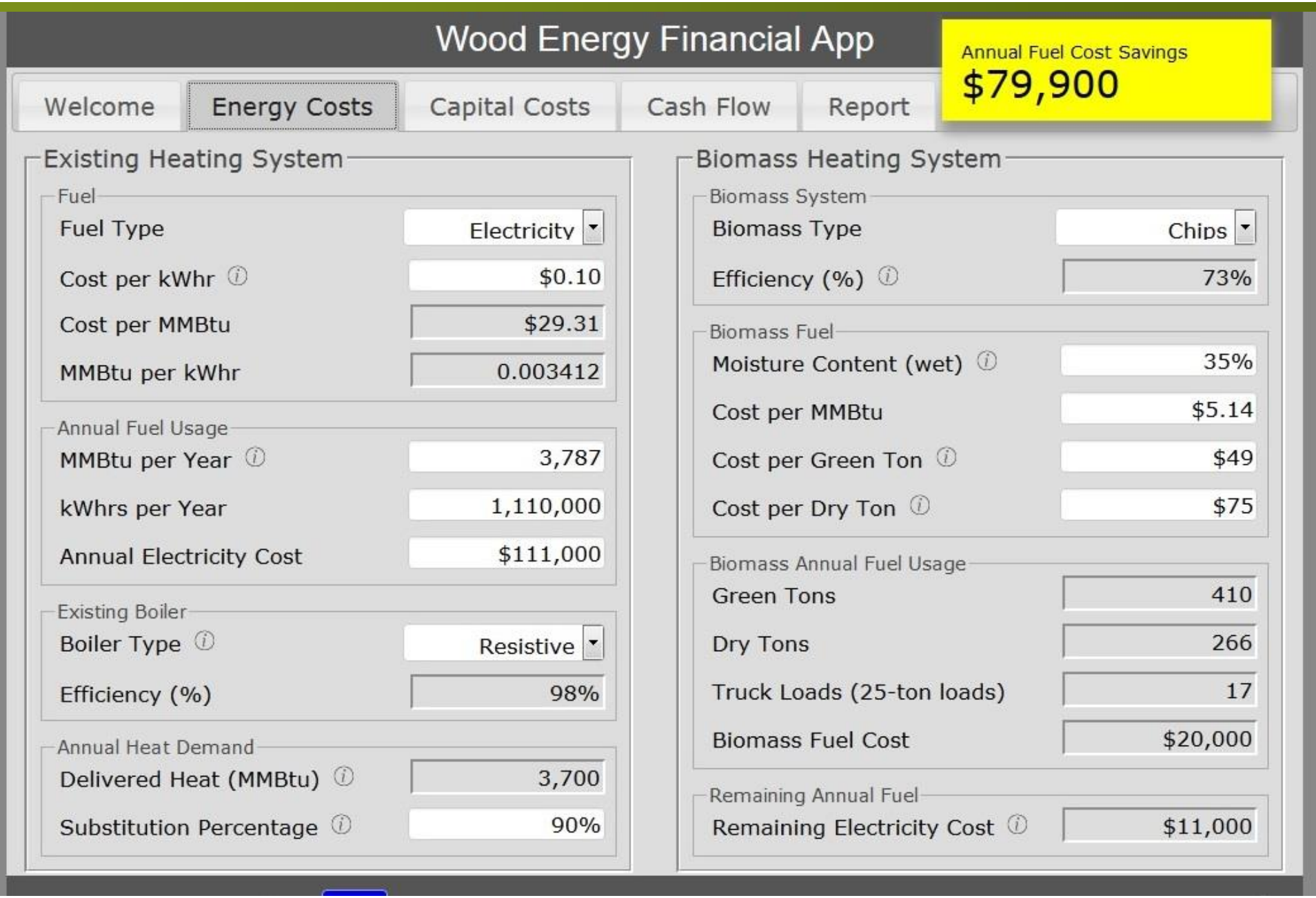
http://woodenergy.umn.edu/BiomassCalculator/

- Energy Costs
- Capital Costs
- Cash Flow

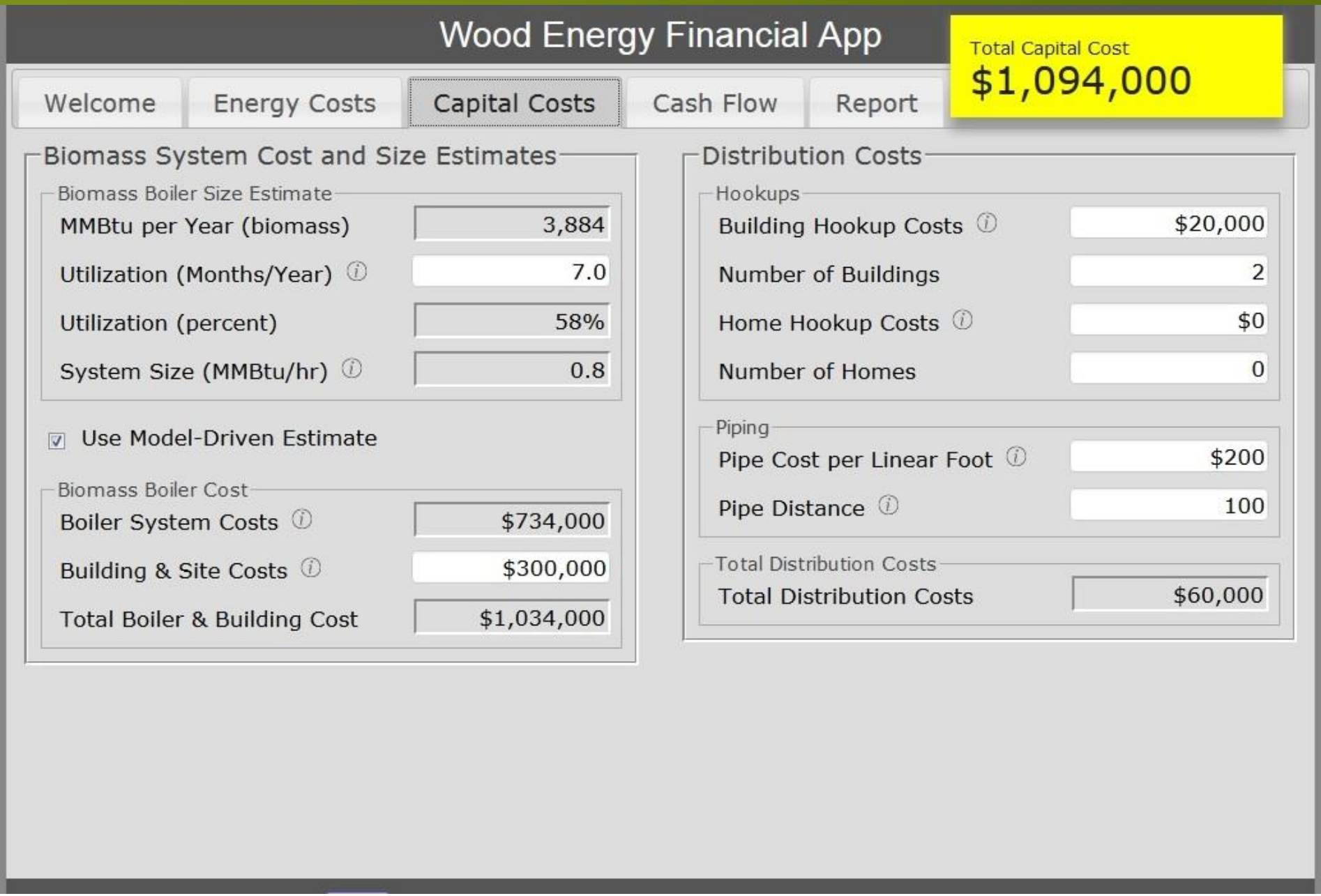
Biomass App

Challis High School and Elementary School
Wood Chip Boiler System

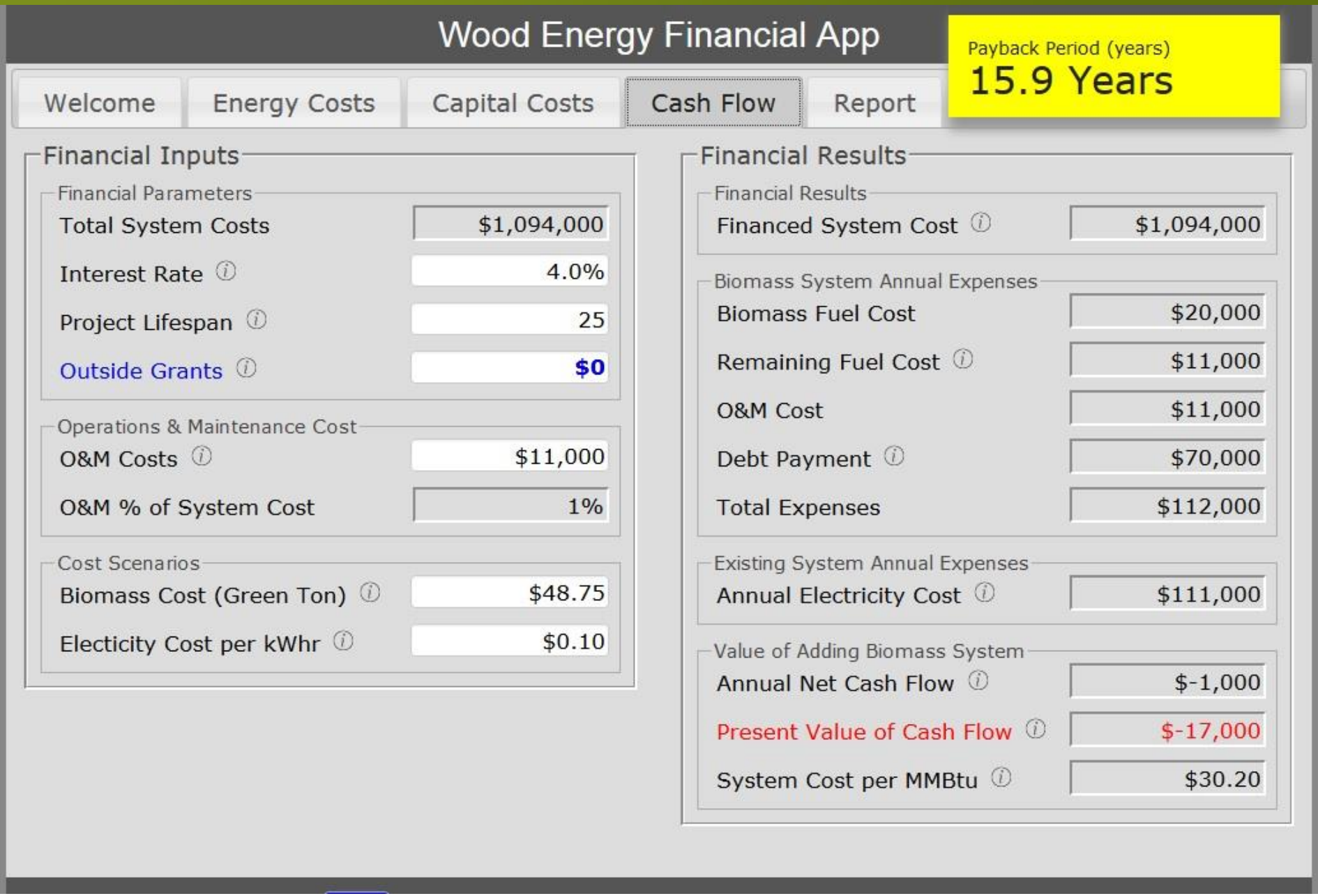
Challis High and Elementary (Chips)



Challis High and Elementary (Chips)



Challis High and Elementary (Chips)



Biomass App

Challis High School and Elementary School Pellet Boiler System

Challis High and Elementary (Pellets)

Wood Energy Financial App

Annual Fuel Cost Savings
$52,700

Welcome | Energy Costs | Capital Costs | Cash Flow | Report

Existing Heating System

Fuel

Fuel Type	Electricity
Cost per kWhr	$0.10
Cost per MMBtu	$29.31
MMBtu per kWhr	0.003412

Annual Fuel Usage

MMBtu per Year	3,787
kWhrs per Year	1,110,000
Annual Electricity Cost	$111,000

Existing Boiler

Boiler Type	Resistive
Efficiency (%)	98%

Annual Heat Demand

Delivered Heat (MMBtu)	3,700
Substitution Percentage	90%

Biomass Heating System

Biomass System

Biomass Type	Pellets
Efficiency (%)	82%

Biomass Fuel

Moisture Content (wet)	6%
Cost per MMBtu	$12.71
Cost per Green Ton	$188
Cost per Dry Ton	**$200**

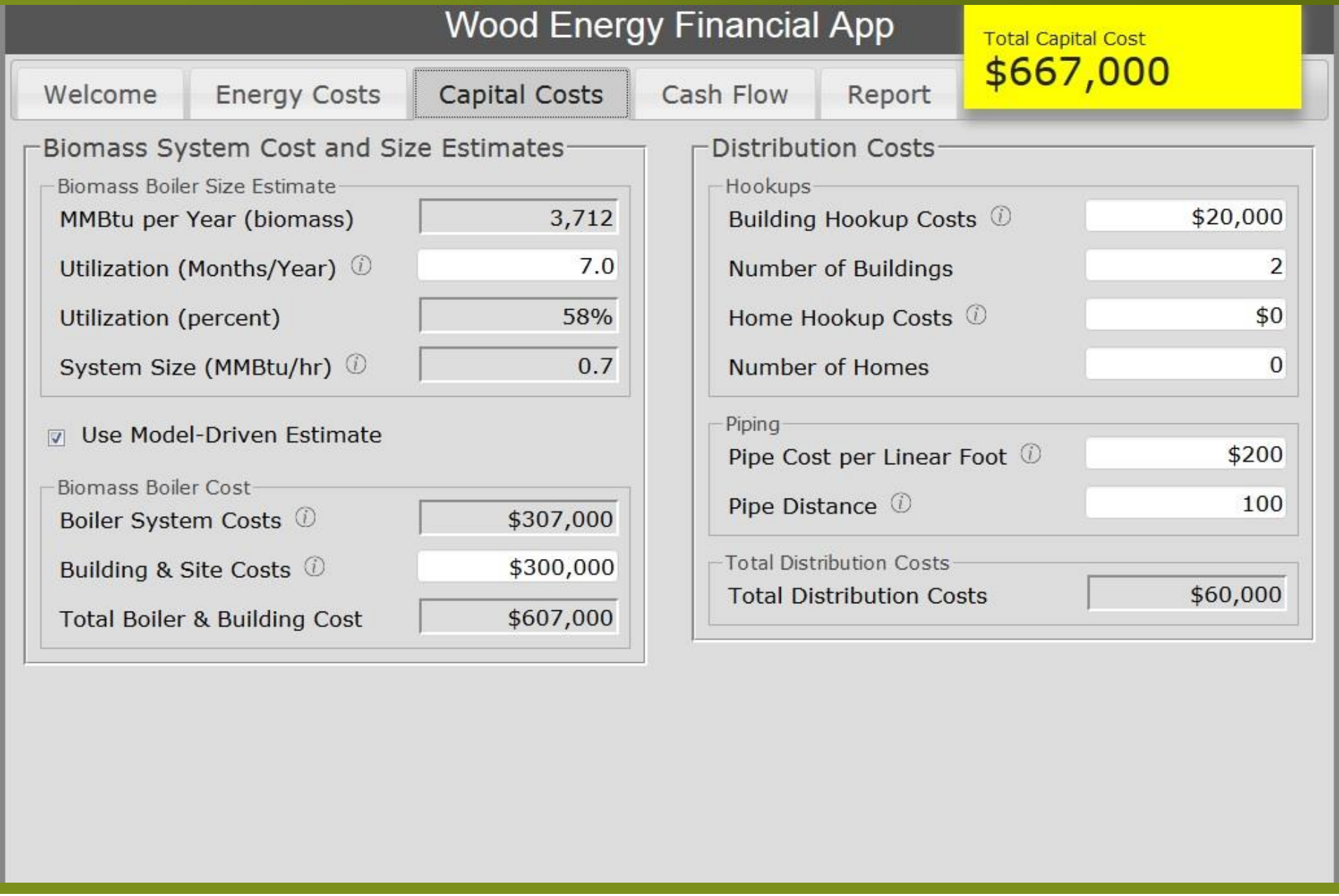
Biomass Annual Fuel Usage

Green Tons	251
Dry Tons	236
Truck Loads (25-ton loads)	11
Biomass Fuel Cost	$47,000

Remaining Annual Fuel

Remaining Electricity Cost	$11,000

Challis High and Elementary (Pellets)



Challis High and Elementary (Pellets)

Wood Energy Financial App

Payback Period (years)
14.6 Years

Welcome | Energy Costs | Capital Costs | Cash Flow | Report

Financial Inputs

Financial Parameters

Total System Costs	$667,000
Interest Rate	4.0%
Project Lifespan	25
Outside Grants	$0

Operations & Maintenance Cost

O&M Costs	$7,000
O&M % of System Cost	1%

Cost Scenarios

Biomass Cost (Green Ton)	$188.00
Electicity Cost per kWhr	$0.10

Financial Results

Financial Results

Financed System Cost	$667,000

Biomass System Annual Expenses

Biomass Fuel Cost	$47,000
Remaining Fuel Cost	$11,000
O&M Cost	$7,000
Debt Payment	$42,700
Total Expenses	$108,000

Existing System Annual Expenses

Annual Electricity Cost	$111,000

Value of Adding Biomass System

Annual Net Cash Flow	$3,000
Present Value of Cash Flow	$48,000
System Cost per MMBtu	$29.08

Eastern Idaho Barriers

- Decreasing resources
- Aging equipment and infrastructure
- Financing and bonding challenges
- DEQ air quality concerns (in Salmon)

Eastern Idaho Opportunities

- Proximity to federal forests and feedstock
- Energy independent culture
- Long-term energy savings potential
- New pellet producer
- Support working forest economy
- Support forest health

Next Steps

- Identify project champions
- Complete supply assessment
- Update feasibility studies (as needed)
- Financial analysis, payback
- Wood to Energy grant for design (2015)
- Identify funding sources (on-going)

QUESTIONS?

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Sustainable Northwest

Biomass Resources

- **Community Biomass Handbook and Financial app:**
  - http://www.woodenergy.umn.edu/communityBiomassHandbook.html
- **Idaho Statewide Wood Energy Team Website:**
  - http://energy.idaho.gov/renewableenergy/biomass.htm
- **Biomass Thermal Energy Council:**
  - https://www.biomassthermal.org/