

FOREST BIOMASS UTILIZATION STRATEGIES: Renewable Energy's Role in Forest Restoration



**Investment Strategies to Restore
Arizona Forests**

October 4, 2013

Tad Mason, CEO, TSS Consultants

Presentation Overview

- Value Proposition
- Value-Added Uses
- Current Technology
- Emerging Technology
- Societal Benefits
- Current Financial Incentives
- Current Trends
- Observations



Value Proposition

- **Primary objective is addressing forest health and restoration.**
- **Seek out market based solutions to change business as usual practices and mitigate catastrophic events that impact forest ecosystems.**



Wallow Fire, Apache-Sitgreaves NF, May 2011

Fire

Fuel Treatment Thinning



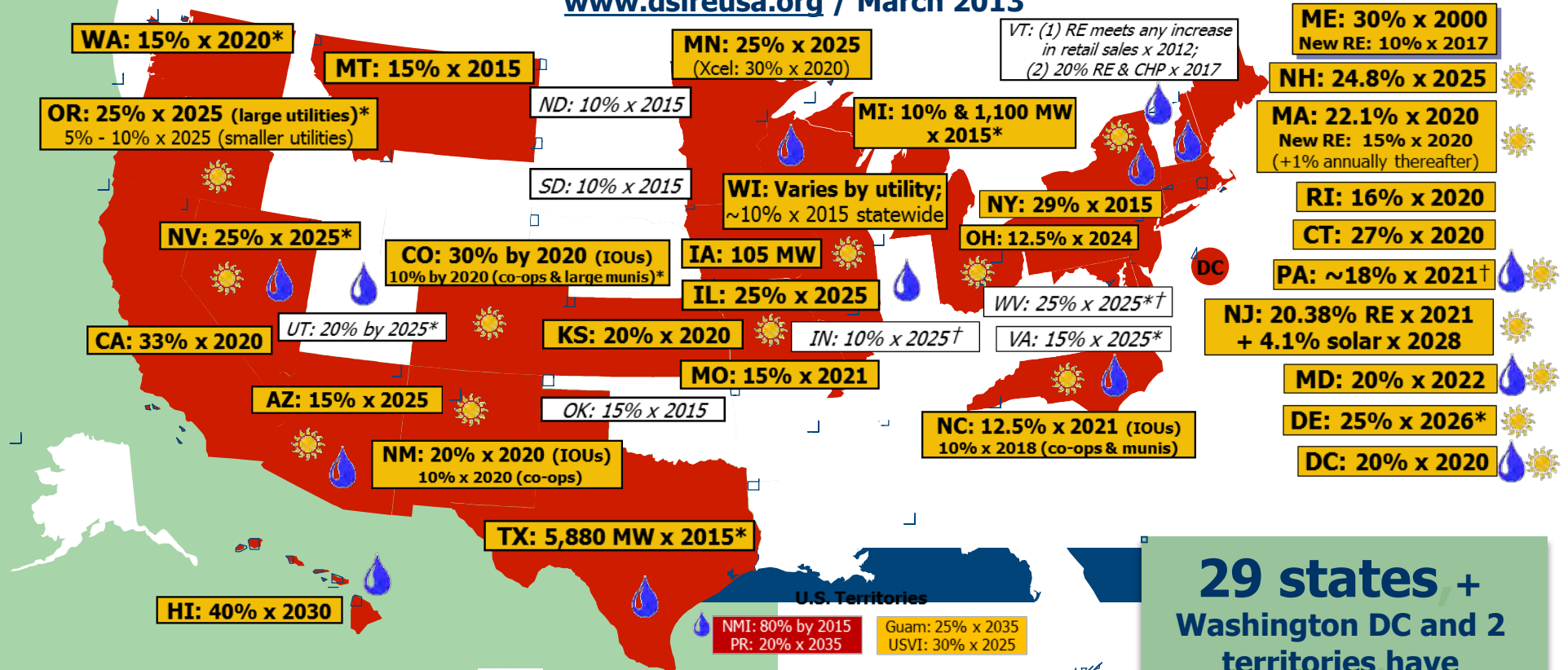
Woody Biomass Utilization

A variety of value-added end uses have evolved over time – Some are commercially proven and some (advanced biofuels) are still in the RD & D Phases.

- Lumber products, composite panels, pulp
- Soil amendment (mulch/compost)
- Firewood/Densified fuel pellets
- Animal Bedding
- Landscape cover
- Biomass power (generation or cogeneration)
- Emerging - Advanced Biofuels (cellulosic ethanol, green diesel)

Renewable Portfolio Standard Policies

www.dsireusa.org / March 2013



- Renewable portfolio standard
- Renewable portfolio goal
- Solar water heating eligible



Minimum solar or customer-sited requirement



* Extra credit for solar or customer-sited renewables



† Includes non-renewable alternative resources

**29 states +
Washington DC and 2
territories have
Renewable Portfolio
Standards**

*(8 states and 2 territories have
renewable portfolio goals)*

Conventional Biomass Disposal Method - Open Pile Burning

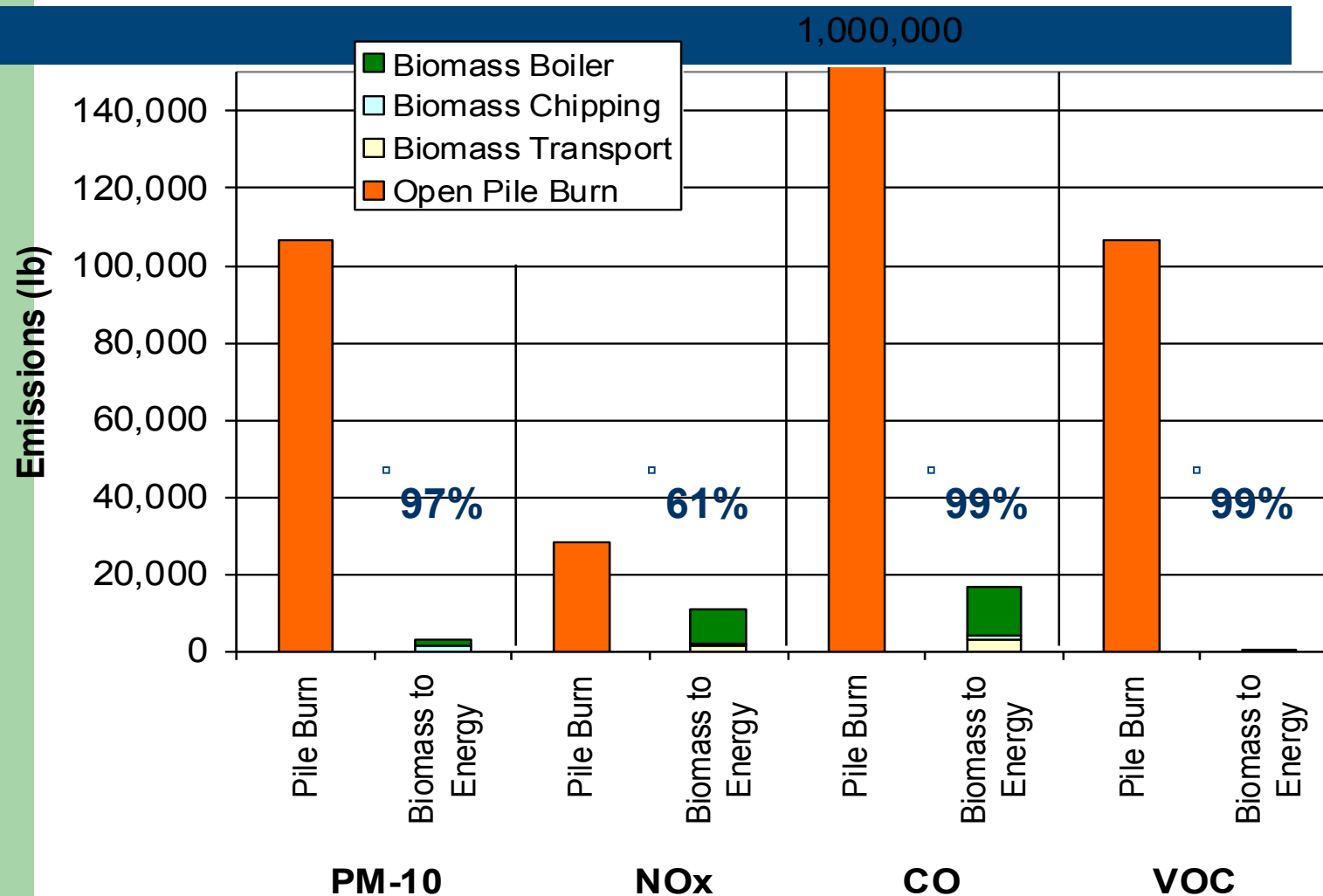




Criteria Air Pollution Emission Reductions

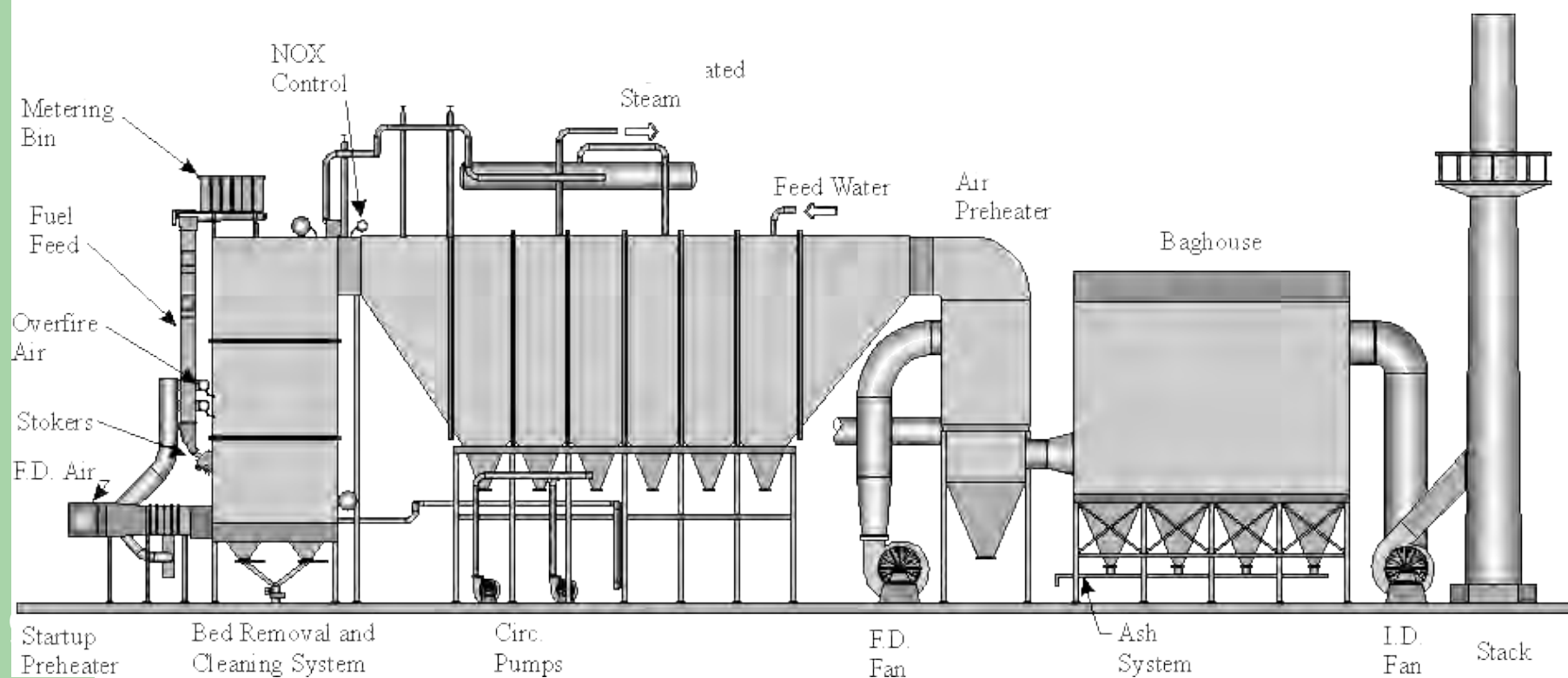
Open Pile Burn vs. Biomass Fuel to Energy

(Findings courtesy of Place County Air Pollution Control District)



Current Combustion Technology

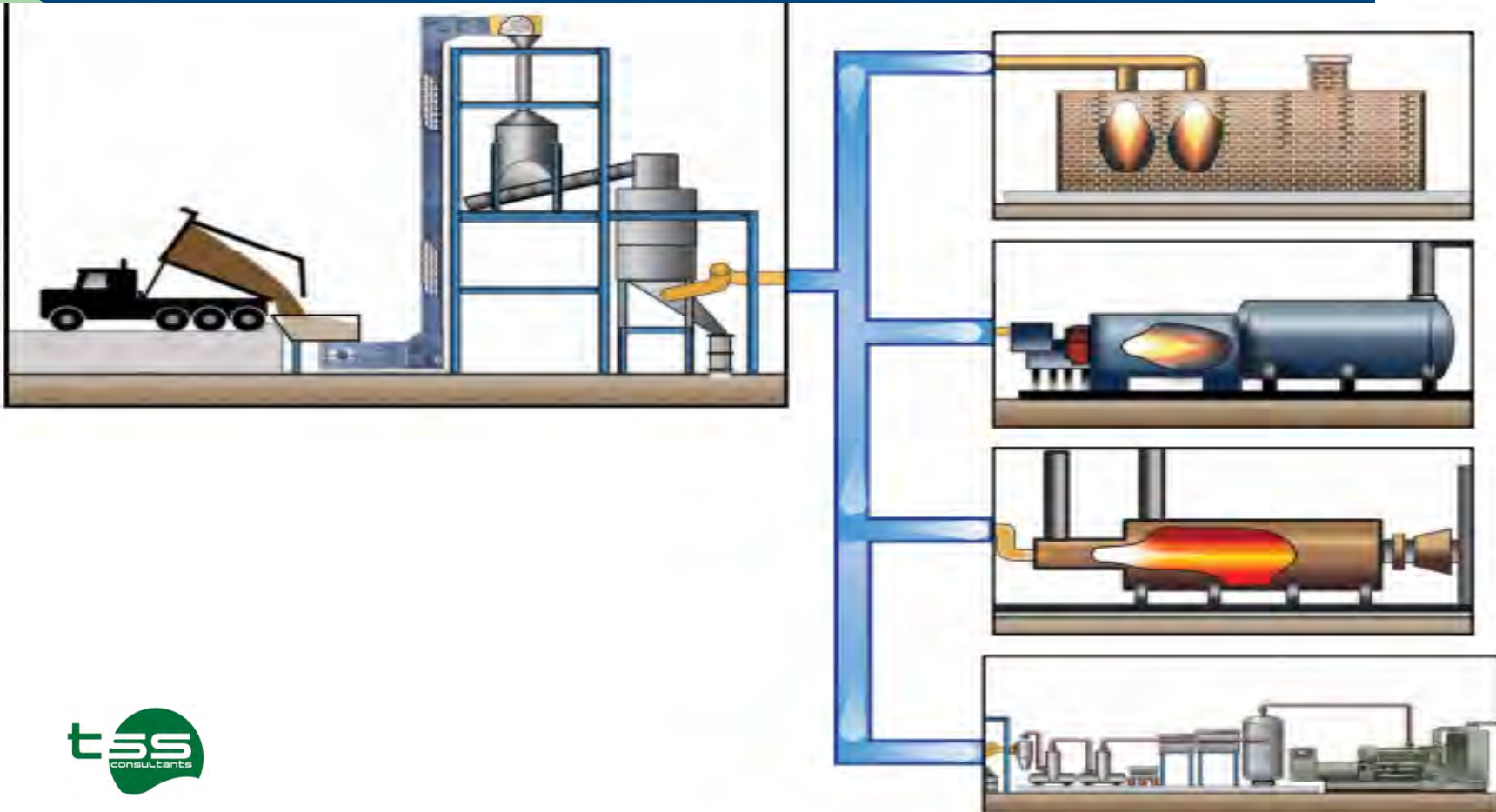
Typical EPI Energy System





Burney Forest Power 31 MW CHP at Burney, CA

Emerging Technology: Gasification





Community Power Corp Gasifier - 12.5 KW,
Philippines



Phoenix Technologies Biomass 500 kWh
Gasification Unit at Merced, CA

Benefits of Biomass Power Generation

- Provides baseload renewable energy (24/7).
- Has numerous societal benefits:
 - Supports hazardous fuels reduction and healthy forests/healthy watersheds
 - Provides employment (4.9 jobs/MW)
 - Greenhouse gas reduction displacing fossil fuels
 - Reduces waste material destined for landfills
 - Net improvement in air quality

Federal Incentives and Policies (examples)

- Business Energy Investment Tax Credit
- Renewable Energy Production Tax Credit
- New Markets Tax Credit
- US DOE Procurement Policy



State Incentives and Policies (examples)

- Oregon - Biomass Producers Tax Credit
- Oregon - Business Energy Tax Credit
- Washington - Initiative 937
- California – SB 1122



Current Trends – Part I

- Conversion of existing coal fired power generation facilities to biomass or to co-fire with biomass.
- State legislative push towards small-scale distributed generation facilities. Example – move to technology specific feed in tariff rates (California Senate Bill 1122).
- Diversion of forest biomass away from BAU practice of pile and burn and towards alternative uses – including bioenergy.

Current Trends – Part II

- Much interest in replacing aging fossil fuel fired thermal energy systems with biomass fired systems (climate change is a driver).
- Capital costs for small-scale biomass gasification systems are trending downward (<\$5M/MW).
- **Downward pressure on wholesale energy prices. Several states have SRAC and MPR pricing tied directly to current natural gas prices.**

Recommendations in Support of Policies that Incentivize Bioenergy Project Development

- De-couple NG pricing from renewable energy wholesale prices.
- Confirm societal and ratepayer benefits for Arizona.
- Set wholesale renewable power rates commensurate with ratepayer benefits.





Tad Mason, CEO TSS Consultants
Rancho Cordova, California
916.266.0546
tmason@tssconsultants.com

www.tssconsultants.com