Forest Biomass and Air Quality

"The trees are going to come out of the forest one way or another."

- Rep. Tom McClintock, Lake Tahoe Summit 8/20/14

Controlled/Prescribed Burning

- Prescribed burning by USFS, CalFire, SPI & others
- 37,408 tons of forest waste was burned 2013 from 3,384 acres.
- 15,566 tons was pile and 21,842 understory
- AQMD approved burning of 6,502 acres in 2013, but limited by weather conditions and other factors.

Emission Comparison

	SAND FIRE 4,240 ACRES (tons)	PRESCRIBED BURNING 2013 3,384 ACRES (tons)
PM10	675	328
NOx	606	79
VOCs	400	207
CO	6,421	3,058
GHG'S (CO2, CH4, N20)	99,533	67,551

(tons)

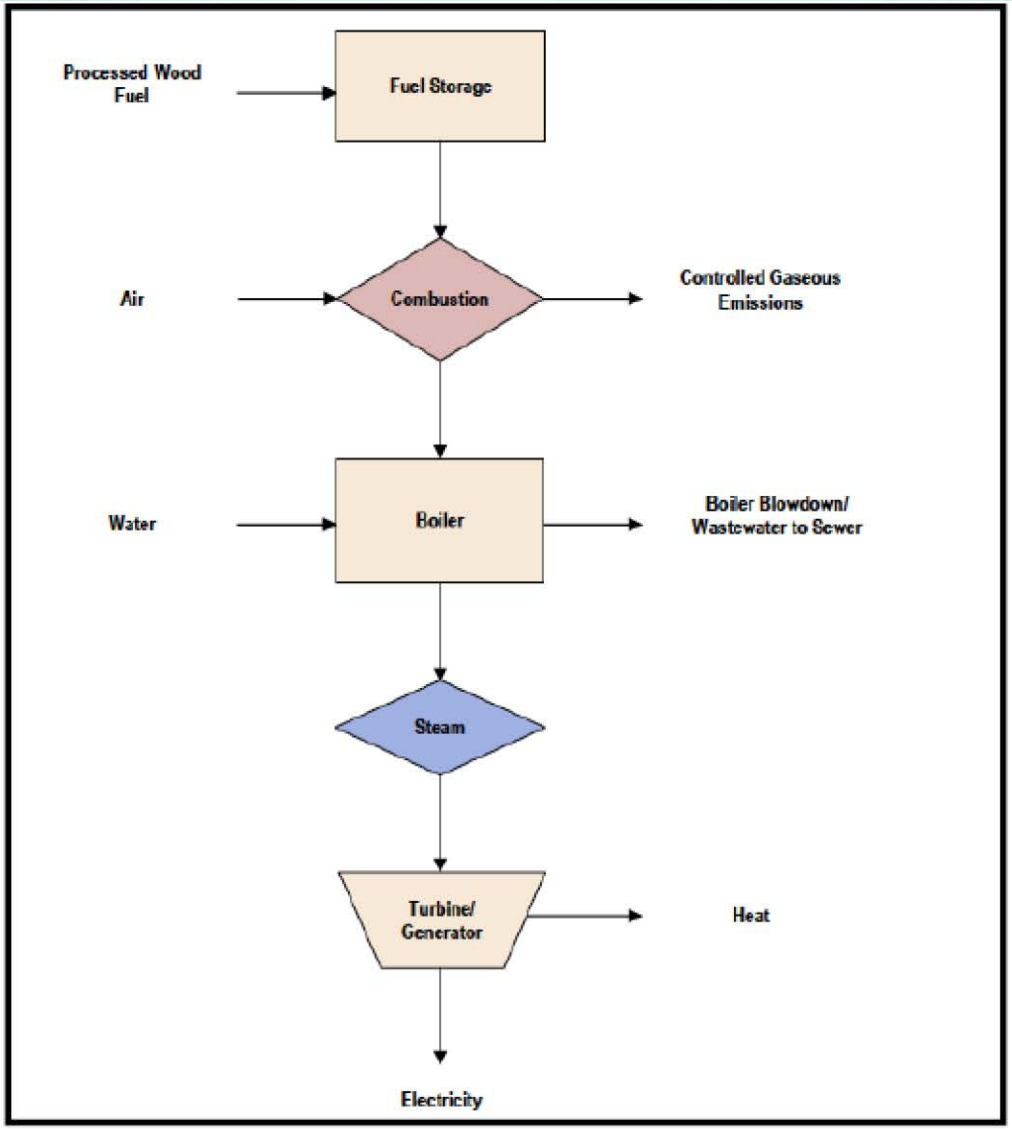
Alternatives to Burning

- Remove the 3” to 12” diameter material
- Remove Biomass for Controlled Combustion
- Remove Biomass for Gasification
- Removal not practical on slopes > 35%
- Material on slopes < 35% accounts for > 80 % of available biomass

Combustion

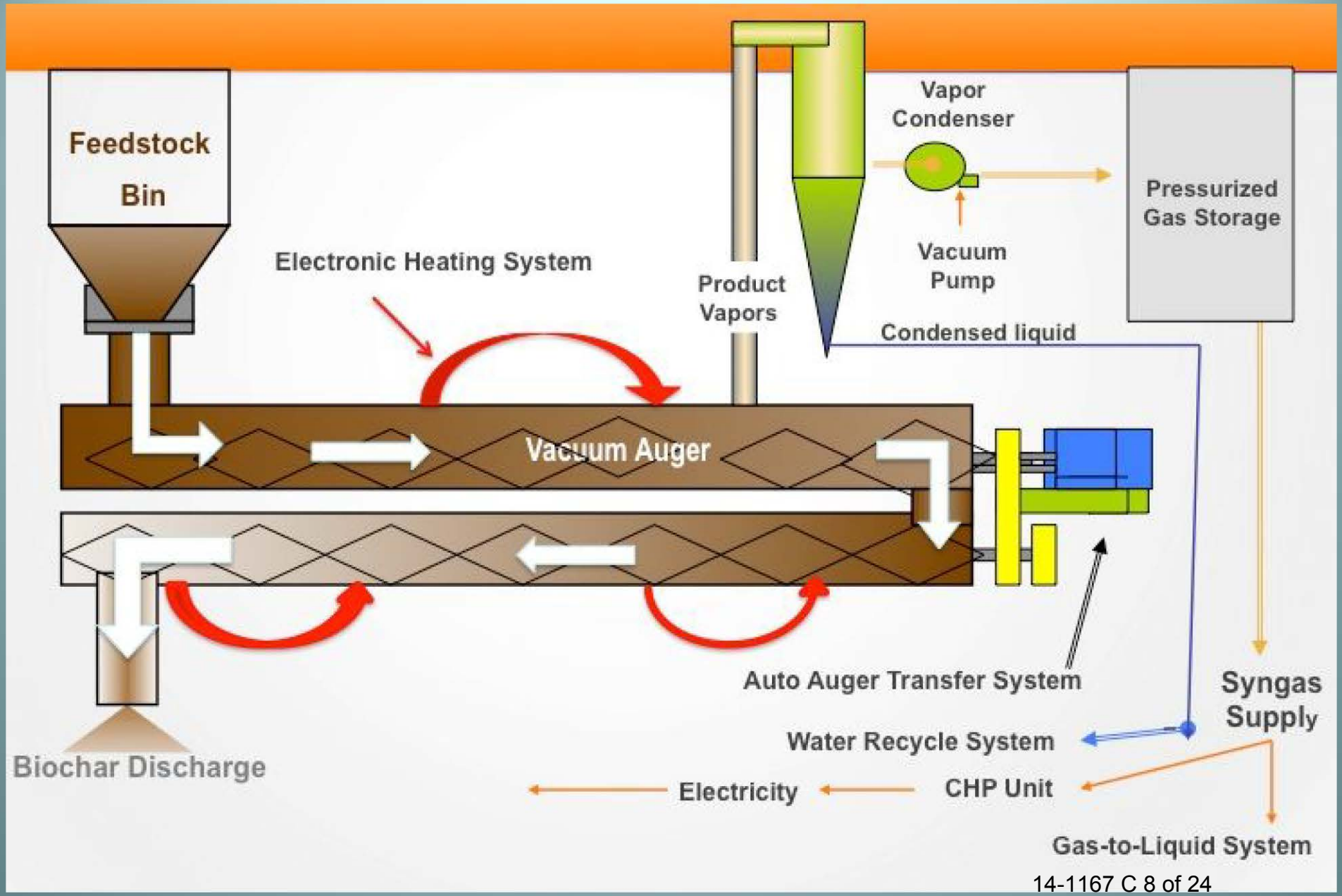
- Materials is combusted or burned to heat water producing steam that spins a turbine producing electricity
- Utilized in several facilities in US, Canada, Europe
- Biomass combustion to electricity efficiency 15 to 20%

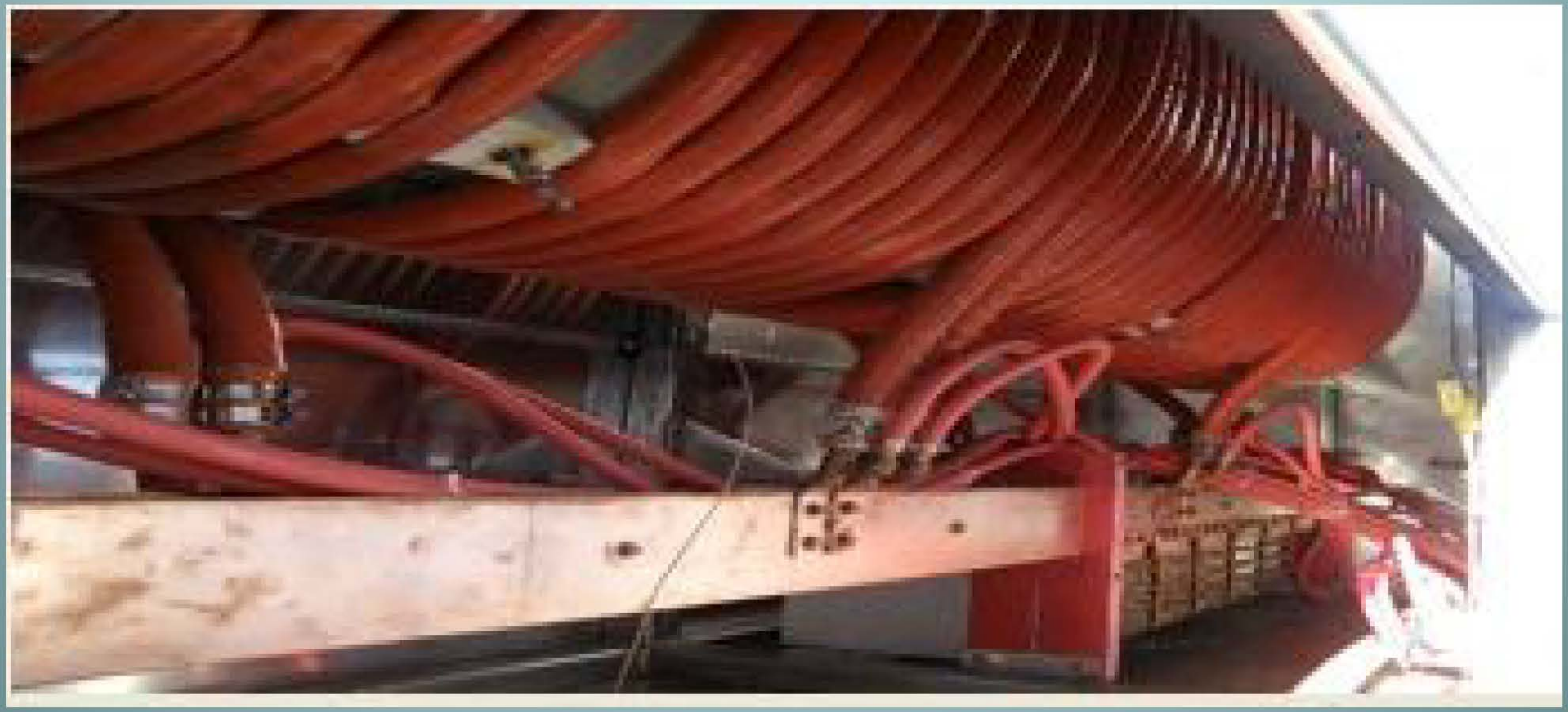
Combustion Process Flow

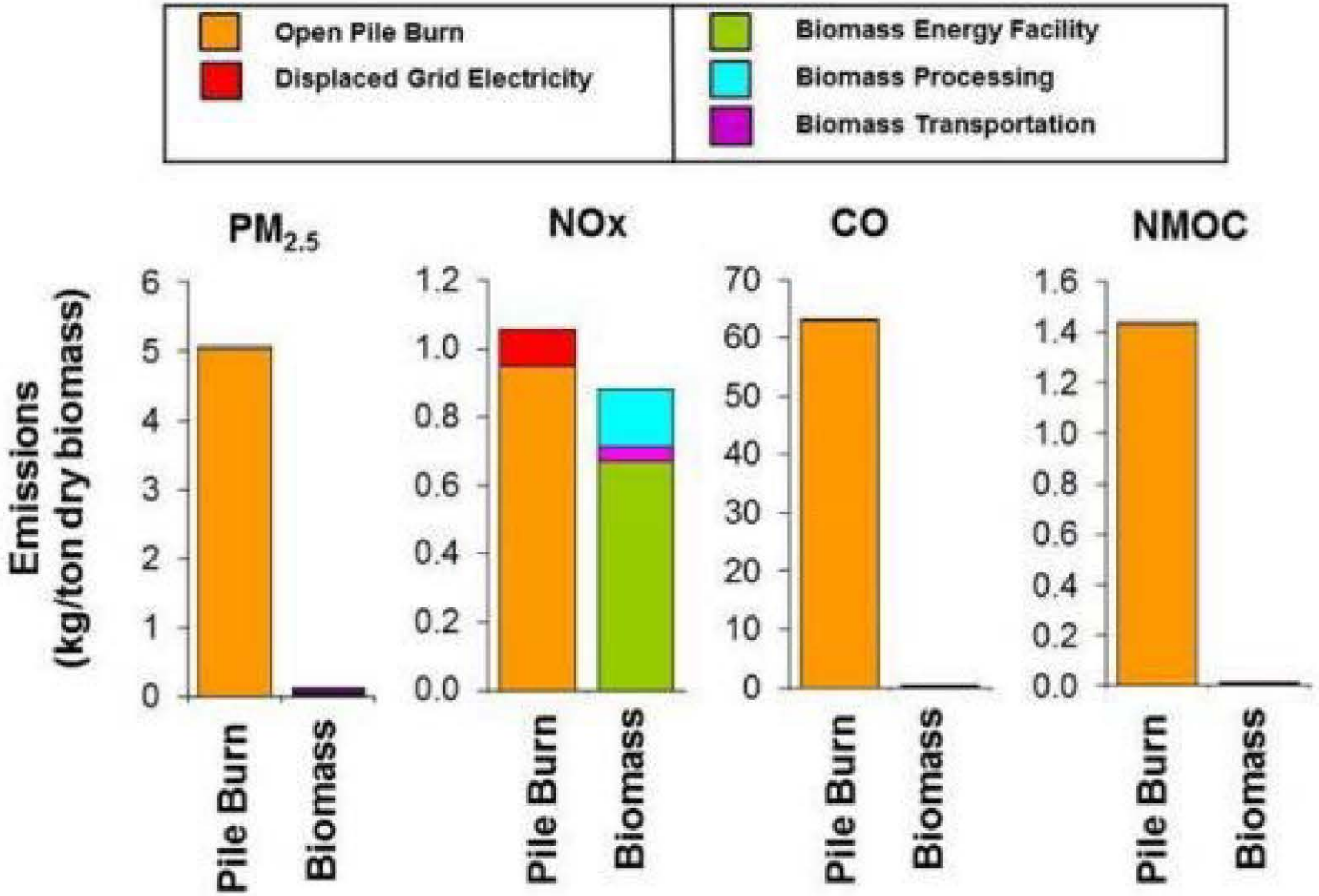


Gasification

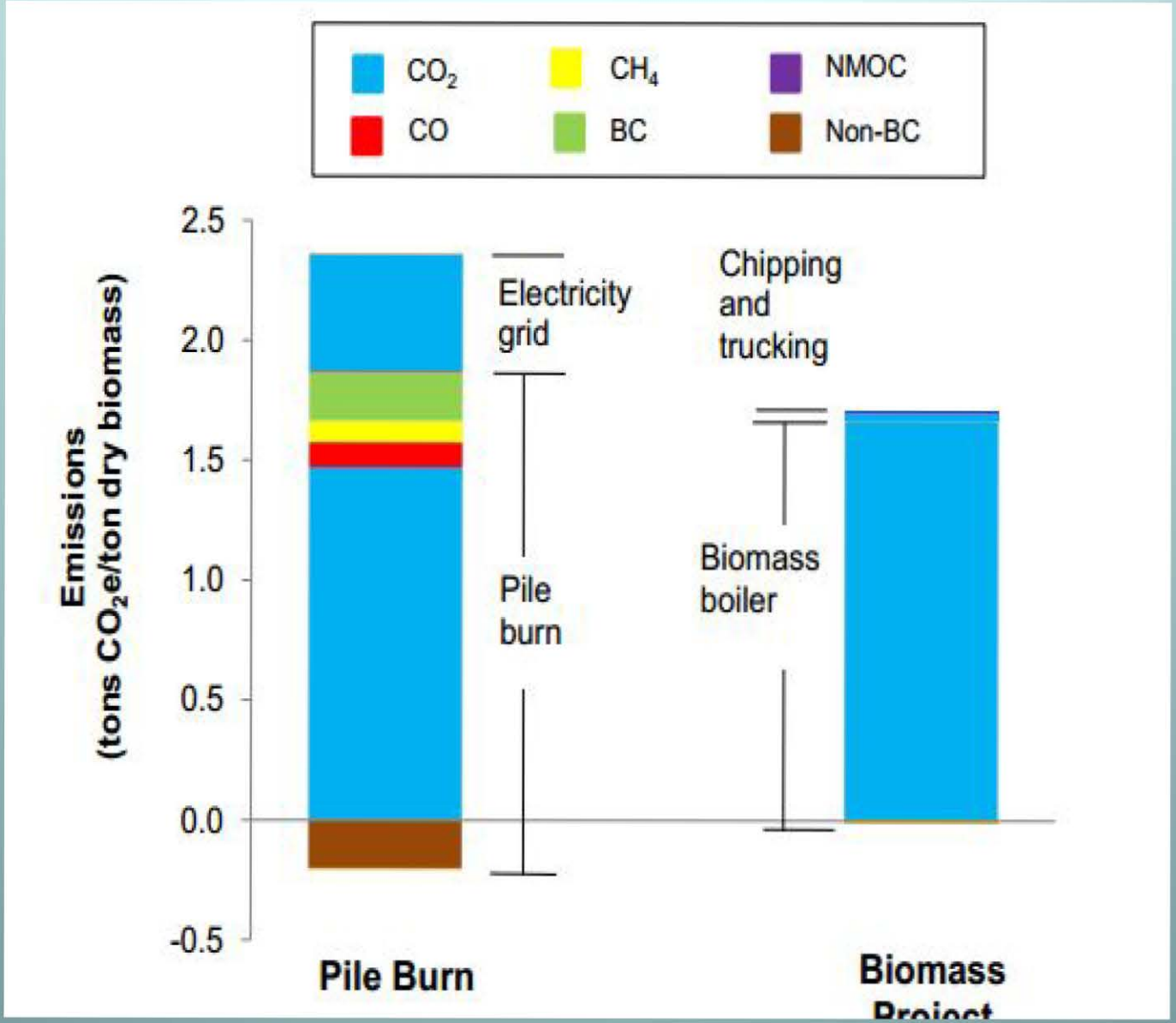
- Thermo chemical conversion of organic solids and liquids into a synthetic gas (syngas) under controlled heat and oxygen conditions
- Syngas can be used to fuel electrical generator
- First used in 1800's to produce city gas from coal
- Used in a few facilities in US, Canada, Europe
- Biomass to electricity efficiency 20 to 35%
- Can also produce a liquid biodiesel fuel
- Byproducts include biochar (10%) and water (~50%)


Feedstock Bin
Electronic Heating System
Vapor Condenser
Vacuum Pump
Pressurized Gas Storage
Product Vapors
Condensed liquid
Vacuum Auger
Auto Auger Transfer System
Syngas Supply
Water Recycle System
Biochar Discharge
Electricity
CHP Unit
Gas-to-Liquid System





Criteria Pollutant Comparison



GHG Emission Comparison

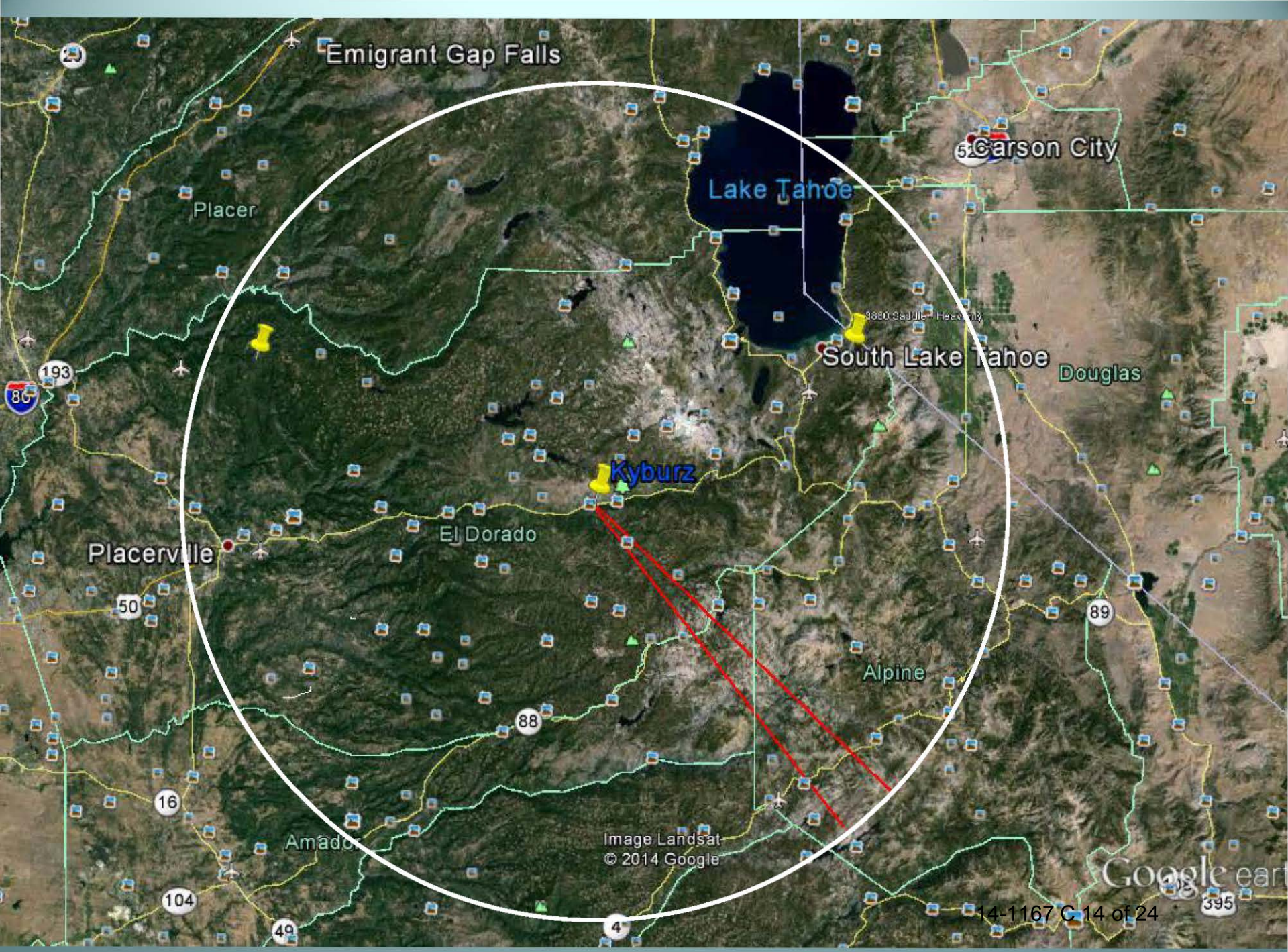
Cabin Creek
Placer County & Phoenix Energy

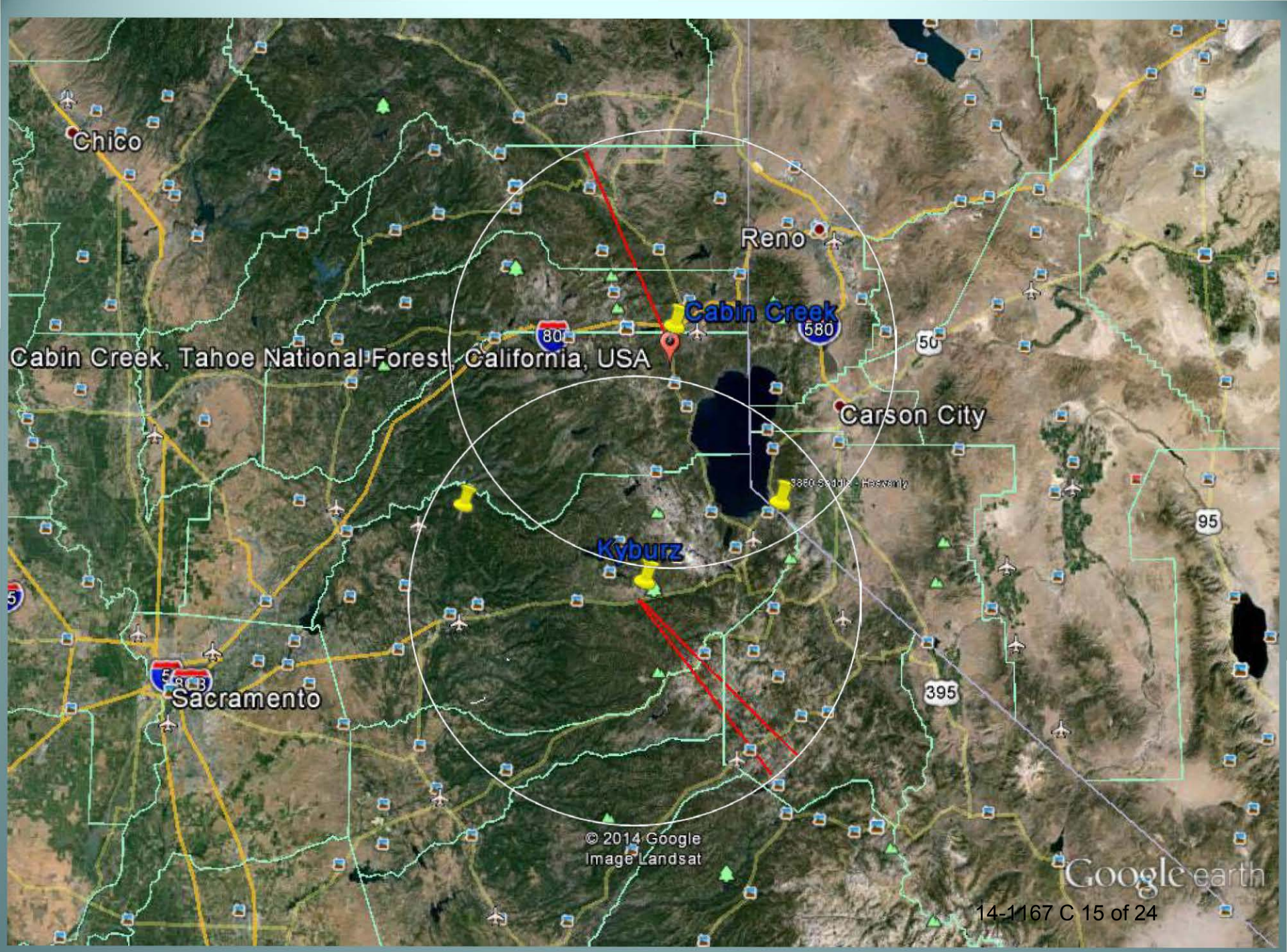
- 2 MW forest biomass facility near Truckee
- Effort began in 2007
- Utilize 10,000 to 17,000 BDT/Year
- 24’ Trucks can Transport 12.5 BDT
- $25/BDT, $312/truck
- 2.19 to 3.7 trucks per day
- Material from up to 30 miles from plant

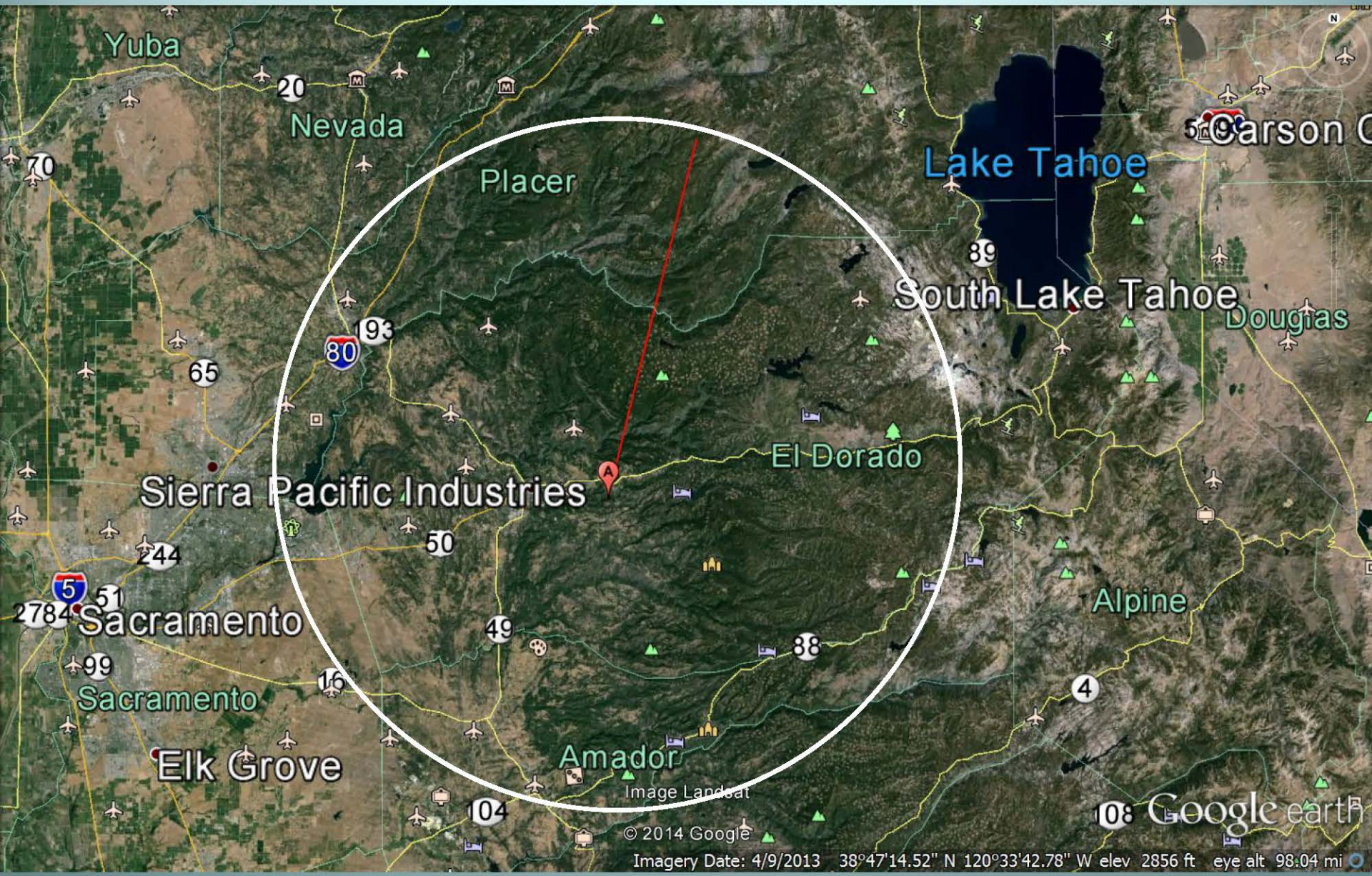
What can EDC do?

EDC unlikely to operate a facility but could:

- Obtain a site
- Facilitate mobile plant
- Assist with planning and permitting
- Secure or allocate funding
- Enter into contracts to support biomass conversion operation


Emigrant Gap Falls
Carson City
Lake Tahoe
Placer
South Lake Tahoe
Douglas
Kyburz
El Dorado
Placerville
Alpine
Amador
Image Landsat
© 2014 Google
Google earth
193
80
50
88
16
104
49
4
89
395


Chico
Reno
Cabin Creek
80
580
50
Cabin Creek, Tahoe National Forest, California, USA
Carson City
Kyburz
95
Sacramento
395
© 2014 Google
Image Landsat
Google earth


Yuba
Nevada
Placer
Lake Tahoe
South Lake Tahoe
Douglas
Sierra Pacific Industries
El Dorado
Alpine
Sacramento
Elk Grove
Amador
Image Landsat
© 2014 Google
Google earth
Imagery Date: 4/9/2013 38°47'14.52" N 120°33'42.78" W elev 2856 ft eye alt 98.04 mi

Funding

- Biochar sale Placer County has contracted to purchase biochar residuals from Pheonix Energy.
- Electricity sale. Placer has secured power purchase agreement with Liberty Energy.
- Diesel fuel sale
- CA Energy Commission PON for Bioenergy Solutions
- Project GHG reduction offsets may be auctioned
- State GHG Reduction Fund Cap and Trade offset auction revenue

PROGRAM OPPORTUNITY NOTICE

Electric Program Investment Charge
Demonstrating Bioenergy Solutions That Support California's Industries, the Environment, and the Grid

PON-14-305

http://www.energy.ca.gov/contracts/index.html

State of California

California Energy Commission

August 2014

Project Group	Available Funding	Minimum Award Amount	Maximum Award Amount
Group 1: Advanced pollution control equipment and low-emission generators	$3,000,000	$500,000	$1,500,000
Group 2: Fuel handling and delivery systems or technologies	$4,000,000		$2,000,000
Group 3: Biochemical conversion technologies or deployment strategies	$10,000,000	$1,000,000	$5,000,000
Group 4: Thermochemical conversion technologies or deployment strategies	$10,000,000		

Marketing GHG Reduction Offsets

- Offset credits must be:
  - Real, beyond business as usual
  - Enforceable, by means such as contract conditions
  - Quantifiable, reductions must be accurately measured
  - Surplus, not required by fed, state or local law
  - Permanent, project emission reductions must not be reversible

Greenhouse Gas Reduction Fund Programs

Appropriations	Potential Projects Identified by Implementing Agencies	2013-14 (M)	2014-15 (M)	2015-16 (%)	% of 2014-15 Funds Benefiting Disadvantaged Communities
High Speed Rail (HSRA) Construction of the initial construction segment in the Central Valley and further environmental and design work on the statewide system. The Budget also provides an ongoing commitment that allows for the advancement of the project on multiple segments concurrently, which yields cost savings and creates an opportunity for earlier potential private sector investment. These investments in the high-speed rail system will alleviate pressure on California's current transportation network and will provide both environmental and economic benefits.	Planning/Design		$59	25%	0-25%
	Right-of-way acquisition of Initial Operating Segment		$191		
	Construction of Initial Operating Segment				
Transit and Intercity Rail Capital Program (CalSTA) Competitive grant program for rail and bus transit operators for capital improvements to integrate state and local rail and other transit systems, including those located in disadvantaged communities, and those that provide connectivity to the high-speed rail system. The Transportation Agency will prepare a list of projects recommended for funding, to be submitted to the California Transportation Commission for programming and allocation.	Connectivity to existing/future rail systems by adding new rail cars/engines		$25	10%	25% (in statute)
	Increase service and reliability of intercity and commuter rail systems				
	Encourage multi-modal transit via integrated ticketing / scheduling				
Low Carbon Transit Operations Program (Caltrans to local agencies) Support new or expanded bus and rail services, with an emphasis on disadvantaged communities. Expenditures are required to result in an increase in transit ridership and a decrease in GHG emissions.	New/expanded bus or rail services or expanded intermodal transit facilities		$25	5%	50% (in statute)
	Service or facility improvements, e.g. equipment, fueling, and maintenance				
Affordable Housing and Sustainable Communities (SGC and member agencies) Implementation of sustainable communities strategies required by SB 375, and to provide similar support to other areas with GHG reduction policies, but not subject to SB 375 requirements. Projects that benefit disadvantaged communities will be given priority. Also, projects will reduce GHG emissions by increasing transit ridership, active transportation (walking/biking), affordable housing near transit stations, preservation of agricultural land, and local planning that promotes infill development and reduces the number of vehicle miles traveled.	Intermodal affordable housing		$130	20%	50% (in statute)
	Transit capital projects				
	Active transportation/complete streets				
	Transit-oriented development				
	Agricultural land preservation				
	Local planning and implementation				
Low Carbon Transportation (ARB) Accelerate the transition to low carbon freight and passenger transportation, with a priority for disadvantaged communities. This investment will also support the Administration's goal to deploy 1.5 million zero-emission vehicles in California by 2025. ARB administers existing programs that provide rebates for zero-emission cars and vouchers for hybrid and zero-emission trucks and buses. These expenditures will respond to increasing demand for these incentives, as well as provide incentives for the pre-commercial demonstration of advanced freight technology to move cargo in California, which will benefit communities near freight hubs.	Passenger ZEV rebates	$30	$200		50%
	Heavy duty hybrid/ZEV trucks and buses				
	Freight demonstration projects				
	Pilot programs (car sharing, financing, etc.) in disadvantaged communities				

Greenhouse Gas Reduction Fund Programs

Appropriations	Potential Projects Identified by Implementing Agencies	2013-14 (M)	2014-15 (M)	2015-16 (%)	% of 2014-15 Funds Benefiting Disadvantaged Communities
Weatherization Upgrades/Renewable Energy (CSD) Installation of energy efficiency and renewable energy projects in single and multifamily low-income housing units within disadvantaged communities. Weatherization measures typically include weather-stripping, insulation, caulking, water heater blankets, fixing or replacing windows, refrigerator replacement, electric water heater repair/replacement, and heating and cooling system repair/replacement. Renewable energy measures include installation of solar water heater systems and photovoltaic systems.	Single-Family Weatherization Multi-Family Weatherization Solar PV and Water Heating		$75		>75%
Energy Efficiency in Public Buildings (CEC) Energy efficiency and energy generation projects in public buildings, including the University of California, the California State University, and courts. Energy savings projects will include lighting systems, energy management systems and equipment controls, building insulation and heating, ventilation, and air conditioning equipment.	Energy audits Building retrofits for energy efficiency Energy generation		$20		<25%
Agricultural Energy and Operational Efficiency (CDFA) Projects that reduce GHG emissions from the agriculture sector by capturing greenhouse gases, harnessing greenhouse gases as a renewable bioenergy source, improving agricultural practices and promoting low carbon fuels, agricultural energy, and operational efficiency.	Water use efficiency Dairy digesters Alternative and renewable fuels Fertilizer research, nitrogen management	$10	$15		<25%
Water Action Plan - Water-Energy Efficiency (DWR) Funding for grants that support water use efficiency projects, leak detection and repair projects that reduce GHG emissions, with additional consideration given to disadvantaged communities. The funding will also support projects at the Thermalito and Hyatt State Water Project facilities.	Efficient hydro energy turbines Water conservation and efficiency grants	$30			<25%
Water Action Plan - Wetlands and Watershed Restoration (DFW) Implement projects that provide carbon sequestration benefits, including restoration of wetlands (including those in the Delta), coastal watersheds and mountain meadows. In addition to furthering the goals of AB 32, these types of projects are integral to developing a more sustainable water management system statewide.	Delta coastal wetlands Mountain meadows Water use efficiency in wetlands		$25		0-25%
Sustainable Forests (CAL FIRE) Urban forests in disadvantaged communities and forest health restoration and reforestation projects that reduce wildfire risk and increase carbon sequestration. These expenditures will enhance forest health and reduce fuel loads in light of climate change increasing wildfire intensity and damage.	Urban and community forestry Fire risk reduction Forest health		$24 $18		>75% 0-25%
Waste Diversion (CalRecycle) Financial incentives for capital investments that expand waste management infrastructure, with a priority in disadvantaged communities. Investment in new or expanded clean composting and anaerobic digestion facilities is necessary to divert more materials from landfills. These programs reduce GHGs and support the 75% solid waste recycling goal.	Organics composting/ anaerobic digestion Increased recycling manufacturing Organics and recycling project loans		$25		<25%
Total		**$70**	**$832**	**60%**	

Climate Action Plan

Lake Tahoe Sustainable Communities Program Documents Series #3

Sustainability Action Plan:

A Sustainability Action Toolkit for Lake Tahoe

December 2013

lake Tahoe

Sustainable Communities Program

Support for Biomass to Energy Alternative

- Healthy Forests Healthy Communities
- Sierra Forest Legacy
- Sustainable Forest Action Coalition
- Sierra Nevada Conservancy
- Quincy Library Group