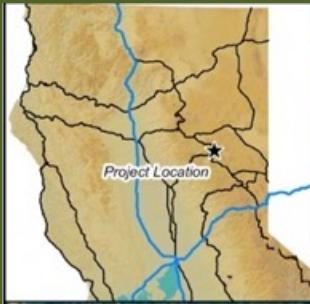




# Operation of the Courthouse Annex Biomass Facility

- Overview of the initial plan
- Sierra Institute's evolving role and cost challenges
- Going forward (how this fits into the larger picture)



# Crescent Mills Wood Utilization Campus

# Stakeholder Outreach

## Plumas County:

- Plumas Unified School District
- Fire Safe Council
- County Officials
- Hospital Administrators
- Feather River College
- Portola City Council
- Plumas National Forest
- Forestry Professionals

## Regional:

- US Forest Service
- State Agencies
- UC Berkley
- State Wood Energy Team
- Biomass Working Group
- Other Communities

## Objectives:

- Identify critical public facilities
- Develop effective Advisory Body

Danielle Banchio, Registered Professional Forester

#2808

Nick Boyd, Feather River College Director of Facilities

David Keller, Plumas County Community Development Commission

Charles Plopper, Professor Emeritus, UC Davis

Dony Sawchuk, Plumas County Director of Facility Services

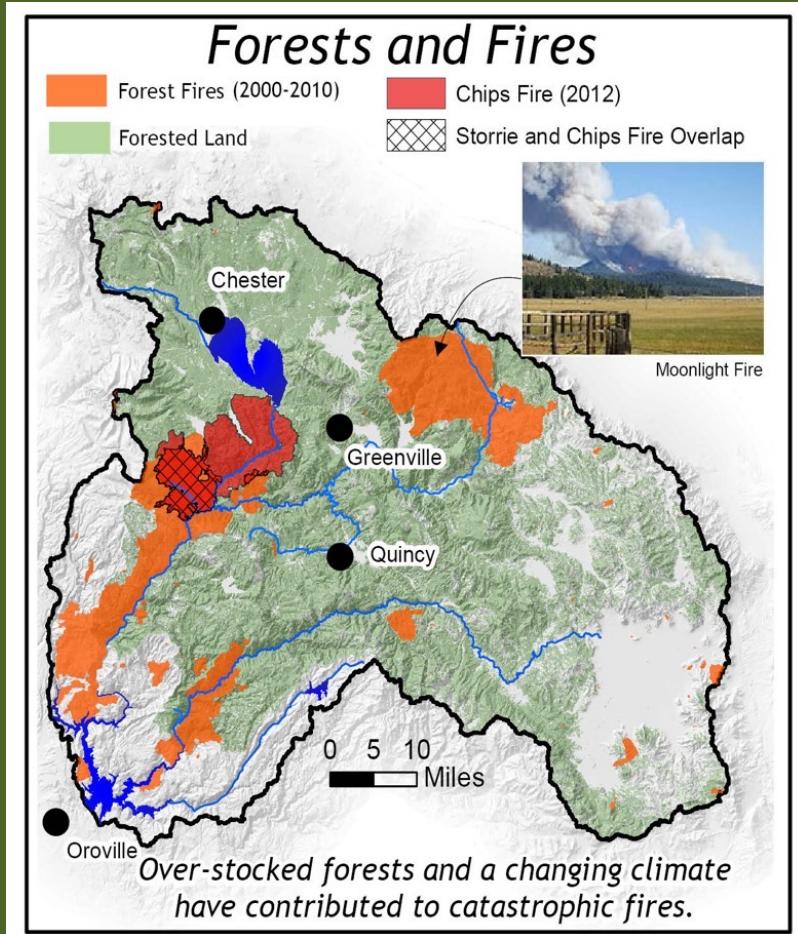
John Sheehan, former Executive Director of Plumas Corporation

Lori Simpson, Plumas County Supervisor District Four

Elaine Vercruyse, Logging Systems Planner with the Plumas National Forest

Randy Wilson, Plumas County Planning Director

## Value of Increasing Biomass Utilization



- Reduce fire risk
- Improve forest health
- Improve air quality and reduce black carbon emissions
- Stabilize heating costs
- Create local jobs
- Reduce fossil fuel use
- Utilize abundant, local resource

## Biomass Utilization in Plumas County

| Biomass Thermal Opportunities     | Current Heating Costs | Fuel Type      | Gallons Used | Biomass Used | Savings     |
|-----------------------------------|-----------------------|----------------|--------------|--------------|-------------|
| Portola District Heating Facility |                       |                |              |              |             |
| <i>Eastern Plumas Heath Care</i>  | \$ 147,500.00         | diesel fuel    | 37,000       | 400 bdt      | \$25,075.00 |
| <i>Portola High School</i>        | \$ 79,500.00          | heating oil    | 22,640       | 210 bdt      | \$13,515.00 |
| <i>Portola City Hall</i>          | \$ 4,700.00           | propane        | 2,582        | 15 bdt       | \$799.00    |
| <i>Portola Library</i>            | \$ 5,500.00           | propane        | 2,750        | 15 bdt       | \$935.00    |
| <i>Portola USPS Building</i>      | \$ 4,000.00           | propane        | 2,300        | 15 bdt       | \$680.00    |
| County HHS/FRC                    | \$ 135,000.00         | electric/Prop. | 17,000       | 200 bdt      | \$45,000.00 |
| USFS Supervisors Office           | \$ 37,000.00          | prop/fuel oil  | 11,500/3,260 | 100 bdt      | \$24,500.00 |
| USFS Mt. Hough RD                 | \$ 35,000.00          | propane        | 14,340       | 115 bdt      | \$20,625.00 |
| Greenville K-12 School            | \$ 112,500.00         | diesel fuel    | 30,646       | 275 bdt      | \$19,125.00 |
| Chester Heating Facility          |                       |                |              |              |             |
| <i>Wildwood Asst. Living Fcty</i> | \$ 60,000.00          | propane        | 26,000       | 175 bdt      | \$38,125.00 |
| <i>Seneca Hospital</i>            | \$ 80,000.00          | diesel Fuel    | 21,000       | 210 bdt      | \$53,750.00 |
| Green Tons/Acre                   | 10 to 15              |                |              |              |             |
| Bone Dry Tons/Acre                | 8 to 12               |                |              |              |             |
| Avg. price of chips (raw mtrl).   | \$60.00               |                |              |              |             |
| Retail chips/bdt (thermal)        | \$125.00              |                |              |              |             |
| Price of heat                     | 83%                   |                |              |              |             |
| <b><u>Thermal Network</u></b>     |                       |                |              |              |             |
| Total biomass needed              | 1,705 bdt             |                |              |              |             |
| Acres treated                     | 150 - 250             |                |              |              |             |
| <b><u>3 MW CHP</u></b>            |                       |                |              |              |             |
| Total biomass needed              | 25,000 bdt            |                |              |              |             |
| Acres treated                     | 2,100 - 3,200         |                |              |              |             |

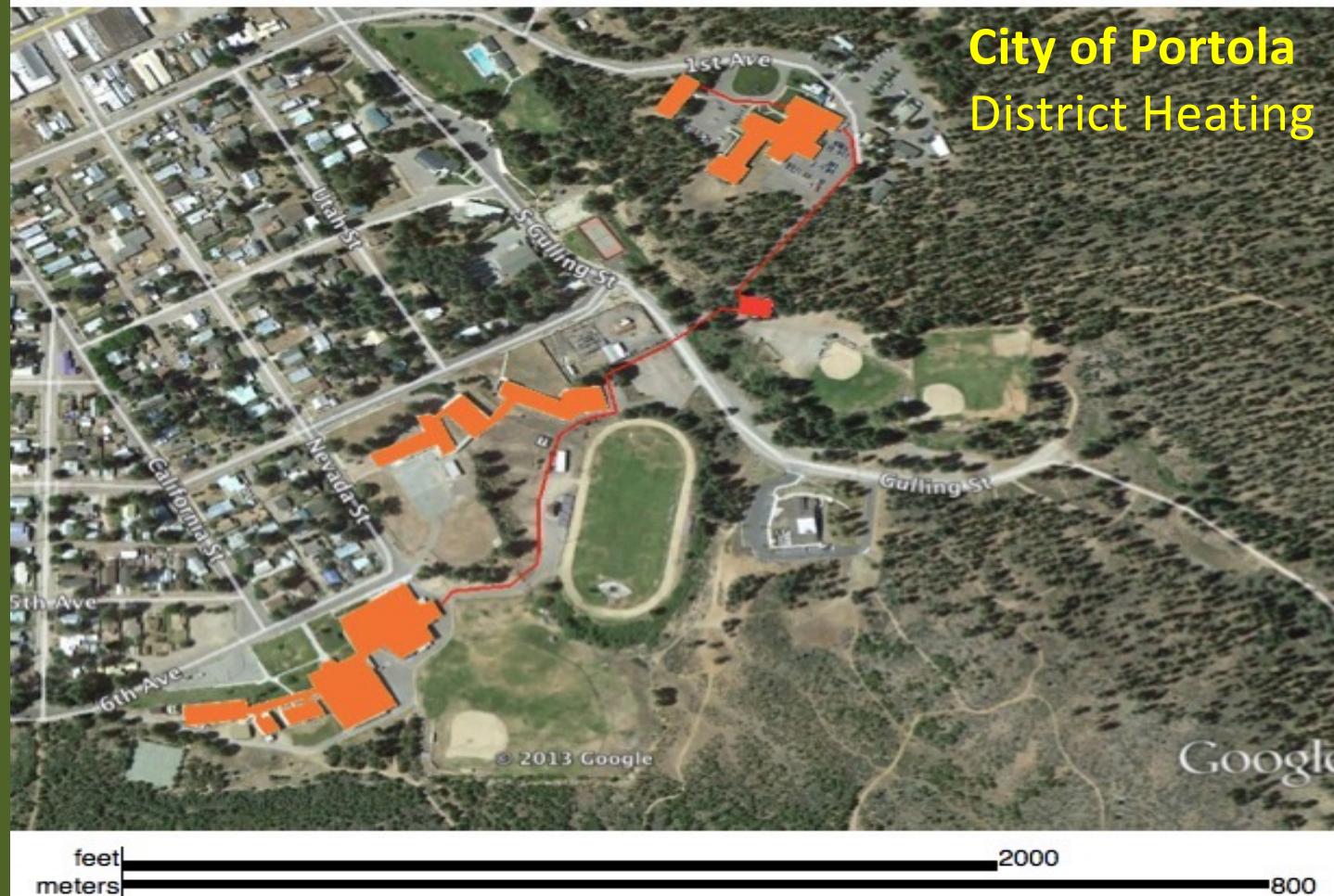
Increased biomass utilization in Plumas County will have the following annual results:

|                             |               |
|-----------------------------|---------------|
| County wide savings:        | \$197,129     |
| Fossil fuel gallons offset: | 170,018       |
| Homes powered:              | 3000          |
| Tons of biomass used:       | 27,000        |
| Acres treated:              | 2,250 - 3,500 |

### KEY

bdt: bone dry ton  
CHP combined heat and power

## City of Portola District Heating



# Greenville Community Energy Facility



## Biomass Utilization in Plumas County

| Biomass Thermal Opportunities   | Current Heating Costs   | Fuel Type   | Gallons Used   | Biomass Used  | Savings   |
|---|---|---|--|---|---|
| Portola District Heating Facility<br><i>Eastern Plumas Heath Care</i><br><i>Portola High School</i><br><i>Portola City Hall</i><br><i>Portola Library</i><br><i>Portola USPS Building</i> | \$ 147,500.00<br>\$ 79,500.00<br>\$ 4,700.00<br>\$ 5,500.00<br>\$ 4,000.00    | diesel fuel<br>heating oil<br>propane<br>propane<br>propane       | 37,000<br>22,640<br>2,582<br>2,750<br>2,300          | 400 bdt<br>210 bdt<br>15 bdt<br>15 bdt<br>15 bdt    | \$25,075.00<br>\$13,515.00<br>\$799.00<br>\$935.00<br>\$680.00          |
| <b>County HHS/FRC</b>   | <b>\$135,000.00</b>   | <b>electric/<br/>Propane</b>                                      | <b>17,000</b>  | <b>200 bdt</b>                                      | <b>\$45,000.00</b>  |
| USFS Supervisors Office<br>USFS Mt. Hough RD<br>Greenville K-12 School<br>Chester Heating Facility<br><i>Wildwood Asst. Living Fcty</i><br><i>Seneca Hospital</i>                         | \$ 37,000.00<br>\$ 35,000.00<br>\$ 112,500.00<br>\$ 60,000.00<br>\$ 80,000.00 | prop/fuel oil<br>propane<br>diesel fuel<br>propane<br>diesel Fuel | 11,500/3,260<br>14,340<br>30,646<br>26,000<br>21,000 | 100 bdt<br>115 bdt<br>275 bdt<br>175 bdt<br>210 bdt | \$24,500.00<br>\$20,625.00<br>\$19,125.00<br>\$38,125.00<br>\$53,750.00 |
| Green Tons/Acre<br>Bone Dry Tons/Acre<br><br>Avg. price of chips (raw mtrl).<br>Retail chips/bdt (thermal)<br>Price of heat   | 10 to 15<br>8 to 12<br><br>\$60.00<br>\$125.00<br>83%                         |   |  |   |   |
| <b>Thermal Network</b>  |   |   |  |   |   |
| Total biomass needed<br>Acres treated   | 1,705 bdt<br>150 - 250  |   |  |   |   |
| <b>3 MW CHP</b>   |   |   |  |   |   |
| Total biomass needed<br>Acres treated   | 25,000 bdt<br>2,100 - 3,200   |   |  |   |   |

Increased biomass utilization in Plumas County will have the following annual results:

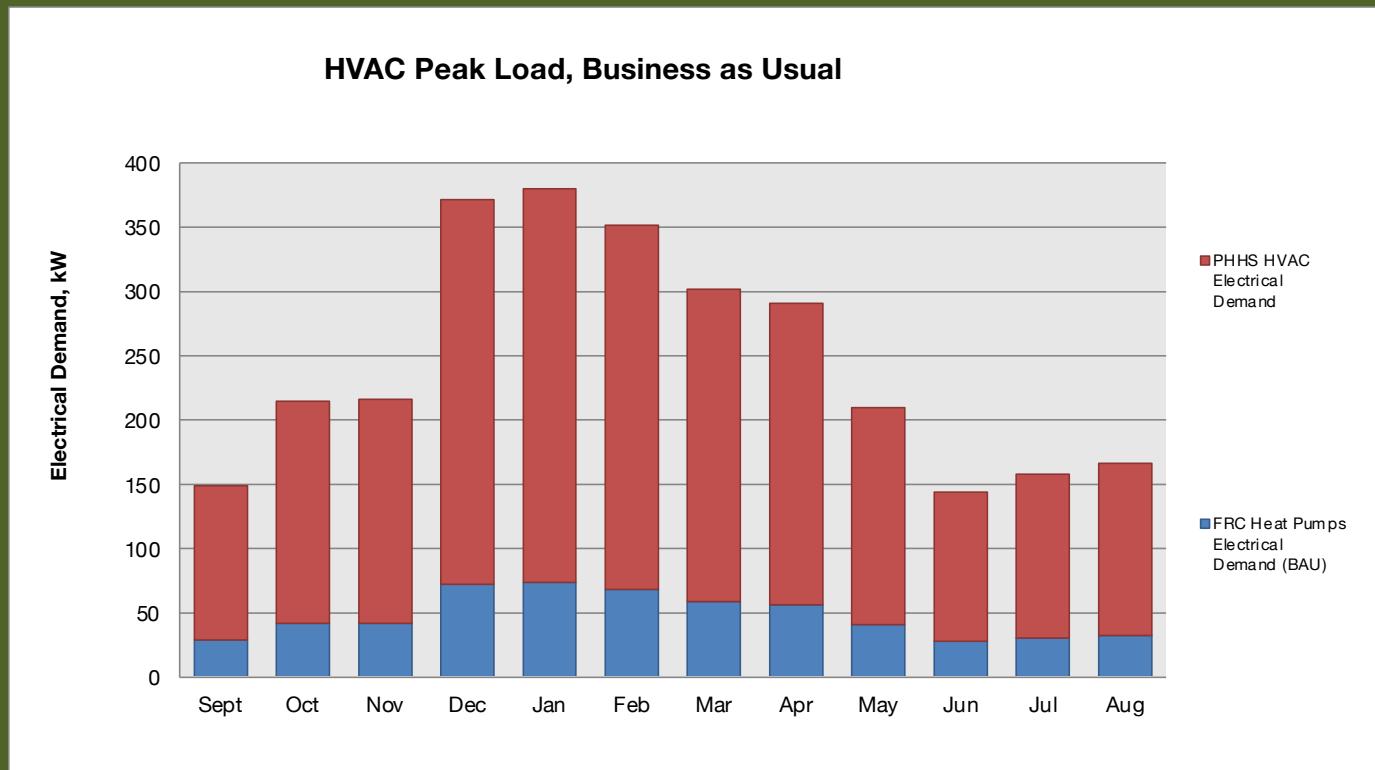
|                             |               |
|-----------------------------|---------------|
| County wide savings:        | \$197,129     |
| Fossil fuel gallons offset: | 170,018       |
| Homes powered:              | 3000          |
| Tons of biomass used:       | 27,000        |
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### KEY

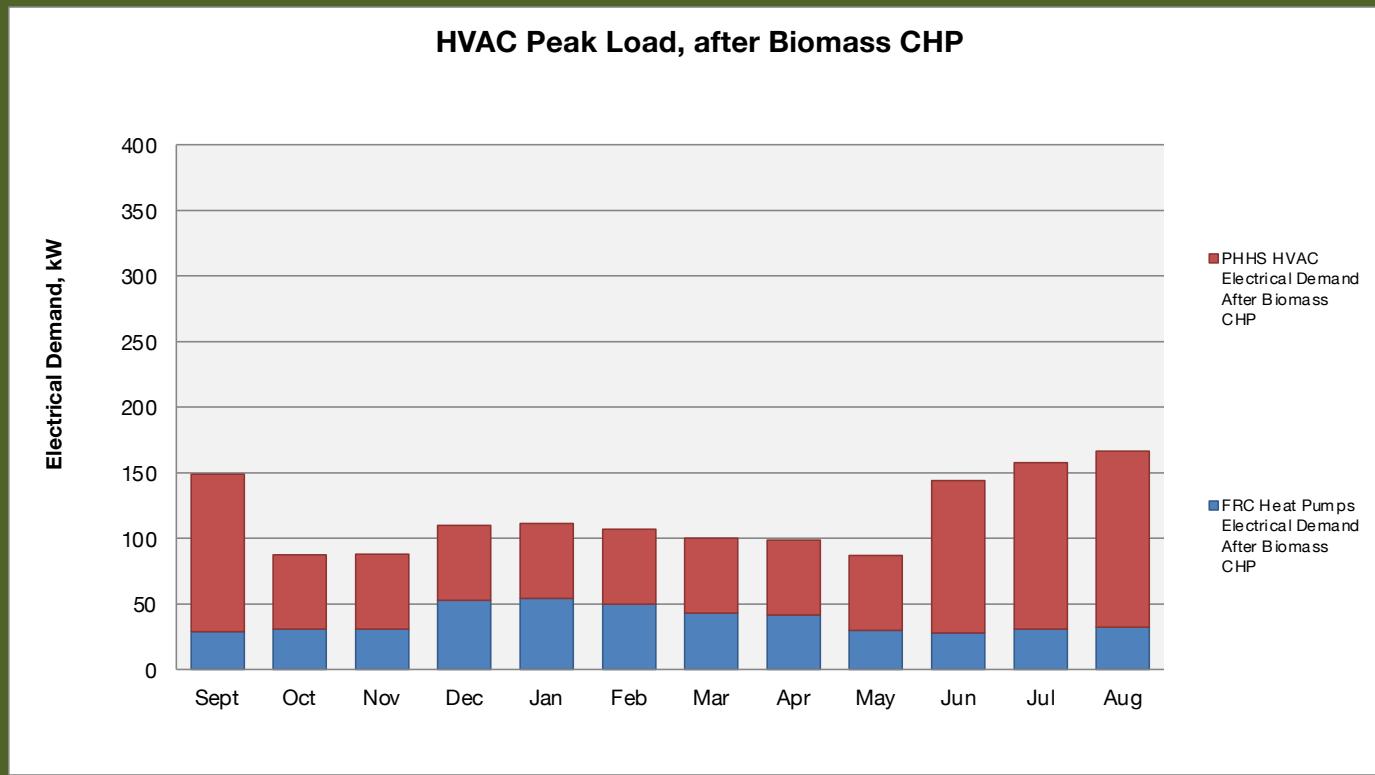
bdt: bone dry ton

CHP: combined heat and power

# Electrical Demand Reduction



# Electrical Demand Reduction



# Sierra Institute's Role in the Plumas County Biomass Energy System

Identifying and addressing hurdles to implementing a sustainable system:

- Expensive capital infrastructure costs
- Challenge of initial years

# Covering chip piles prior to chip shed



# Chip shed constructed to improve chip quality



# Covering Prohibitive Capital Costs

| Item                            | Use   | Cost               |
|---------------------------------|---|--------------------|
| Boiler/Building                 | Providing heat and/or power derived from forest restoration derived biomass | <b>\$2,500,000</b> |
| Temporary use bin-hauling truck | Launch operation with affordable truck                                      | <b>\$22,000</b>    |
| CARB compliant truck            | Support permanent operations  | <b>\$60,000</b>    |
| Storage Shed                    | Storing dry (enough) chips throughout the winter.                           | <b>\$450,000</b>   |
| Chipper/conveyor system         | Processing biomass at the site  | <b>\$150,000</b>   |

# Launching an independent stable operation

- Subsidizing operations in initial years with funding and free site and infrastructure use

Biomass transport to Crescent Mills subsidized

Biomass transport to Crescent Mills unsubsidized

| Biomass Annual Operation Costs |            |                   |              |  |
|--------------------------------|------------|-------------------|--------------|--|
| Fiscal Year                    | Total Bins | Total Annual Cost | Cost per Bin | Comments   |
| FY 18/19                       | N/A        | \$51,434          | N/A          | First year operational. Owned and maintained by Sierra Institute under TESA Contract. Bins used were not tracked by this department. Biomass was generating power as well as heating water for the geothermal ground loop which supplies warmed water for ground-source heat pump units. Billing occurred by Sierra Institute by tracking the amount of BTU's produced by the Biomass on a monthly basis and billed the county for total amount of BTU's used during that month. |
| FY 19/20                       | 47         | \$84,442          | N/A          | Owned and maintained by Sierra Institute under TESA Contract. Biomass was generating power as well as heating water for the geothermal ground loop which supplies warmed water for ground-source heat pump units. Billing occurred by Sierra Institute by tracking the amount of BTU's produced by the Biomass on a monthly basis and billed the county for total amount of BTU's used during that month.  |
| FY 20/21                       | 21         | \$12,125          | \$577        | TESA contract ended and the county assumed ownership and operational expenses of the Biomass. It was determined the generator was not of sufficient size to produce power efficiently and was taken off-line. The Biomass was now only being utilized to heat the water from the geothermal ground loop to supply 'warmed' water to the ground-source heat pump units at the Annex.  |
| FY 21/22                       | 14         | \$6,007           | \$429        | Biomass used only for heating water to the ground-source heat pump units at the Annex.   |
| FY 22/23                       | 16         | \$23,595          | \$1,474      | Biomass used only for heating water to the ground-source heat pump units at the Annex.   |
| FY 23/24                       | 15         | \$44,240          | \$2,949      | Biomass used only for heating water to the ground-source heat pump units at the Annex.   |

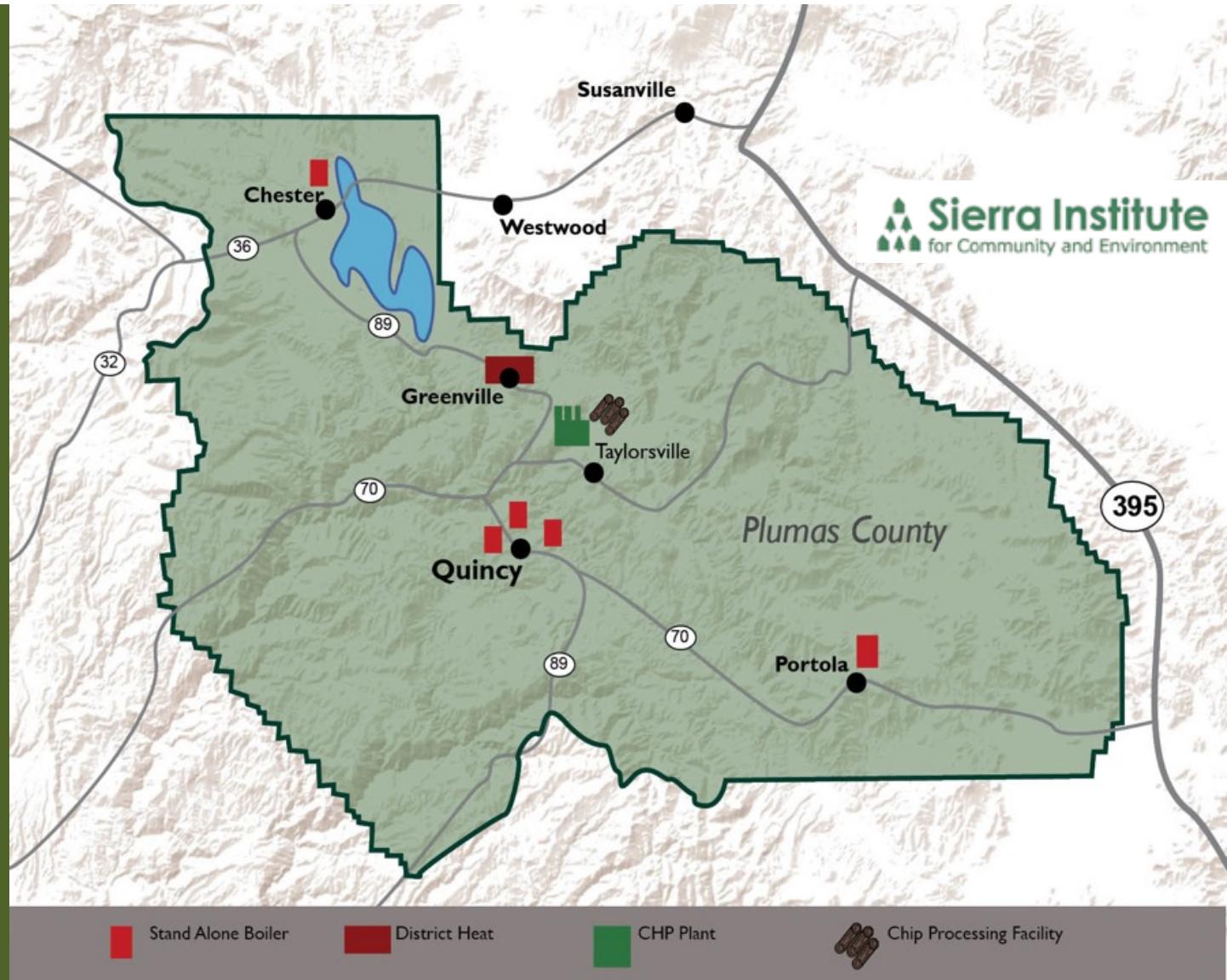
# Moving Forward

- Subsidy while operations are small scale
- Secure contract/agreements that establish biomass sources, agreed upon rates, and billing schedules

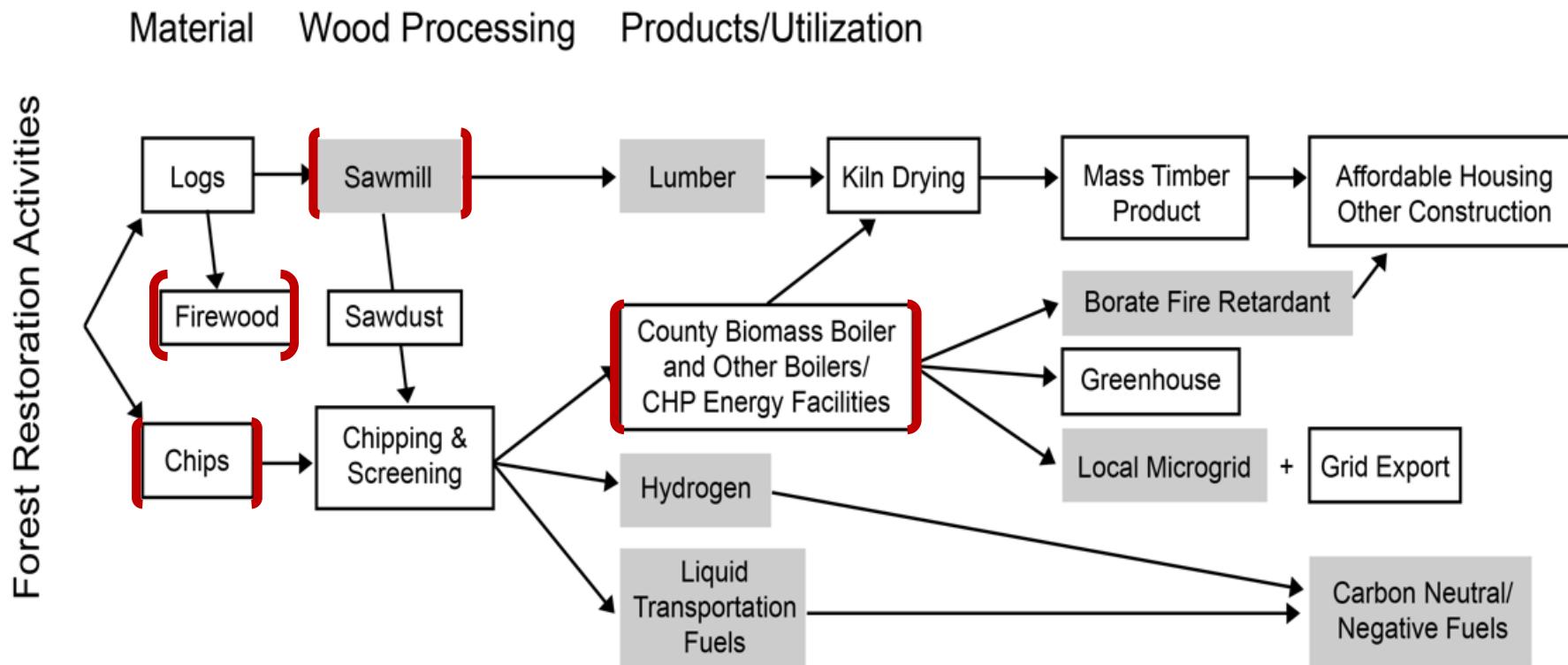
# Long-term sustainability

- Roughly 5 boilers\* of equivalent size needed to support an unsubsidized operation
- 1 boiler = 1 load/4 days = 8hrs/week delivery operation
- 5 boilers = 10 loads/week = 40hrs/week delivery operation

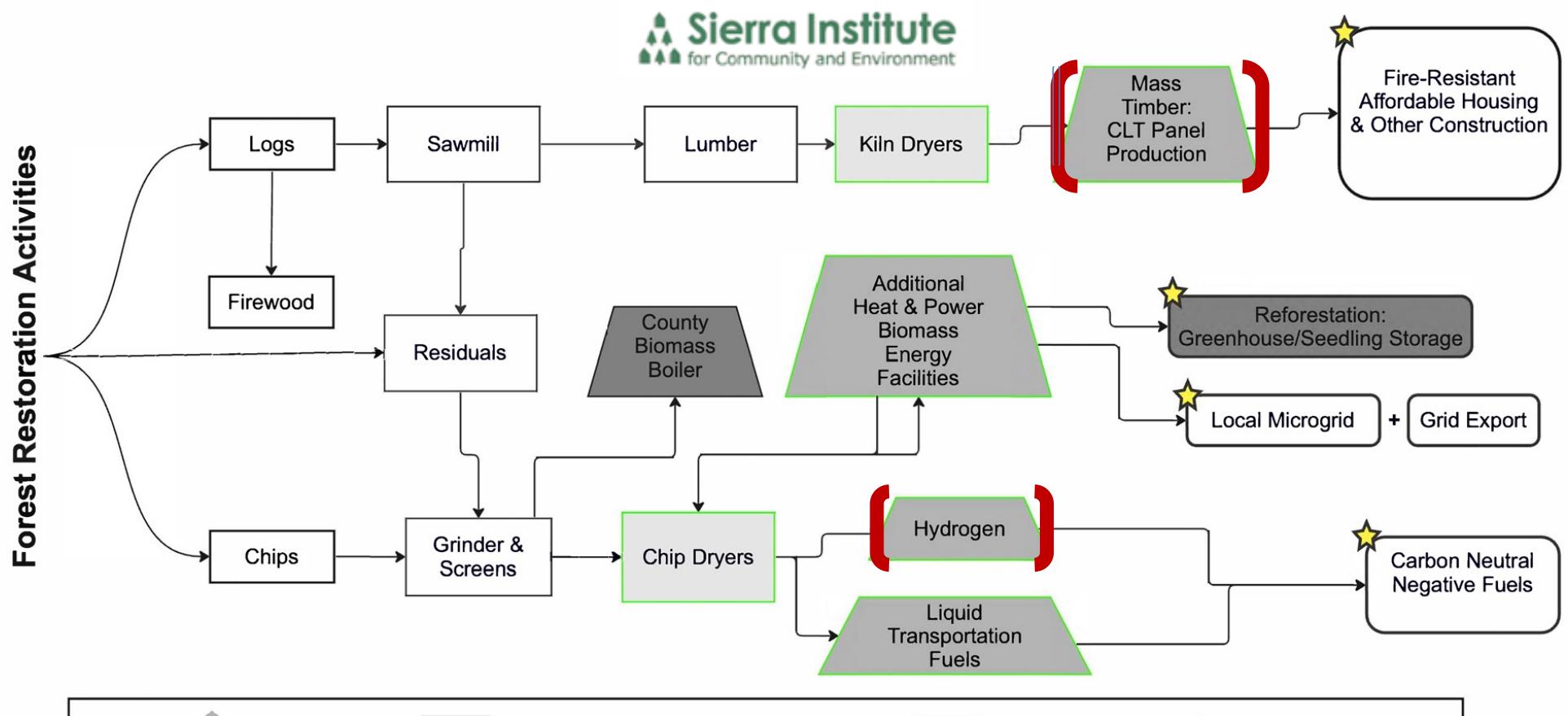
\* Or equivalent business

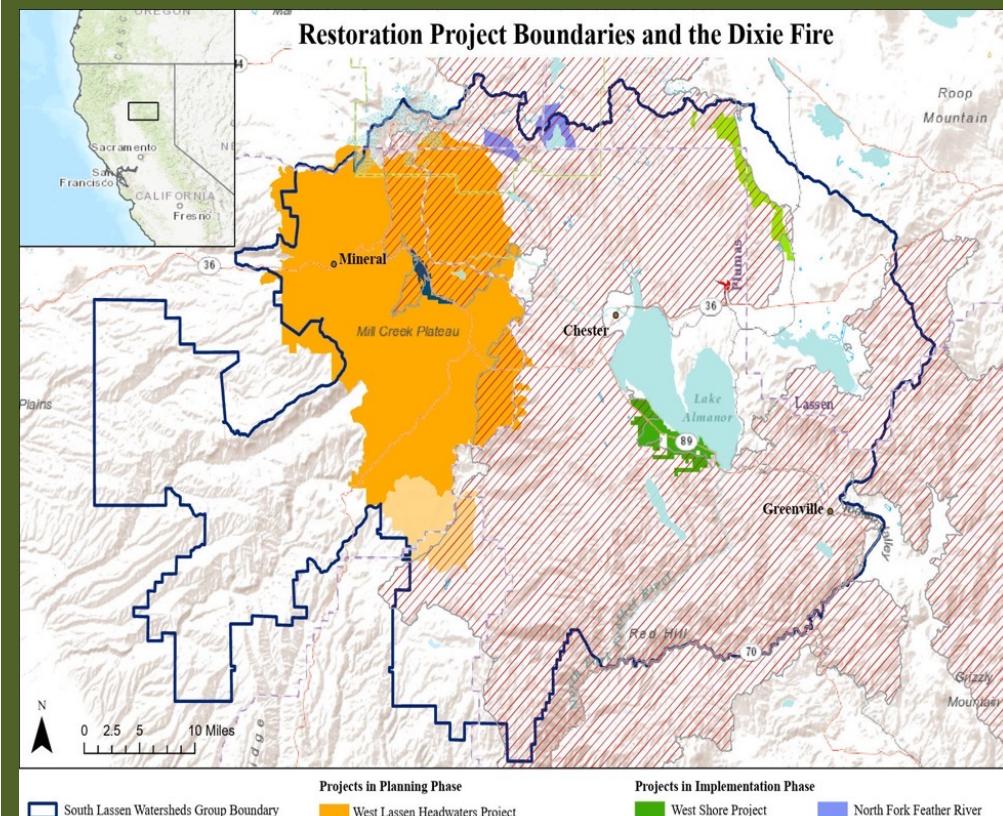


# Indian Valley Wood Utilization Campus Process Flow Diagram



## Indian Valley Wood Utilization Campus Process Flow Diagram

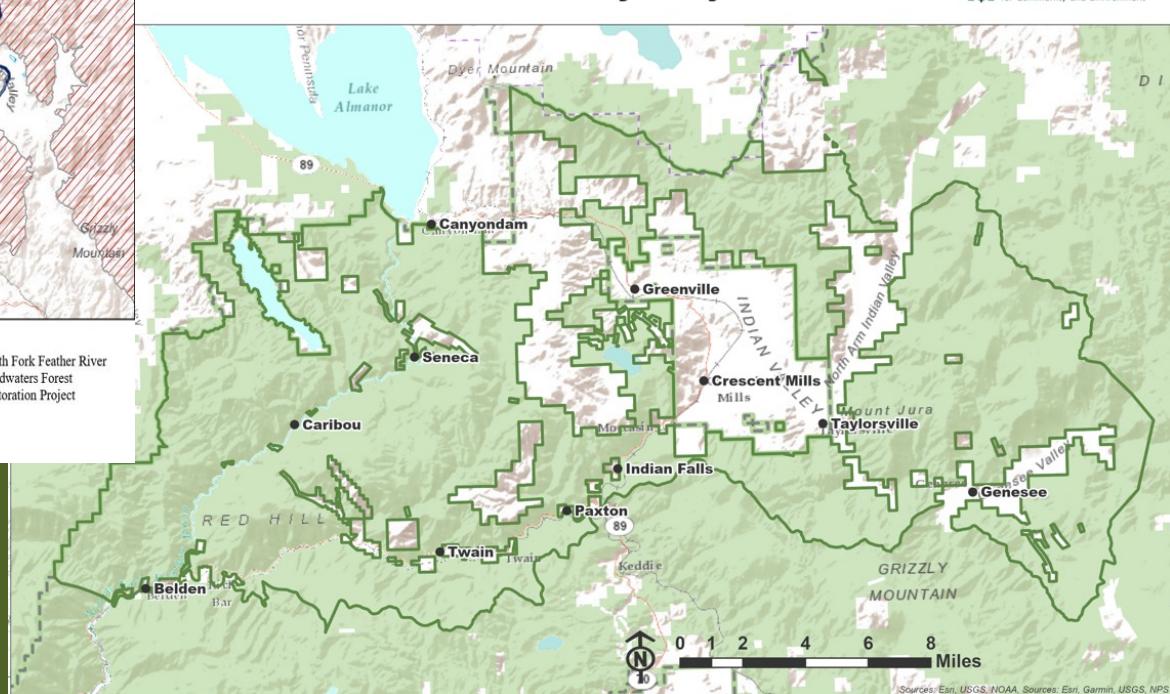




## Landscape Restoration Projects:

- West Lassen Headwaters
- North Fork Forest Recovery Project

### North Fork Forest Recovery Project



Sources: Esri, USGS, NOAA. Sources: Esri, Garmin, USGS, NPS



Roundhouse Council  
Grand Opening  
Ribbon Cutting  
June 20, 2024 1pm  
Greenville



# Operation of the Courthouse Annex Biomass Facility

Thank you!