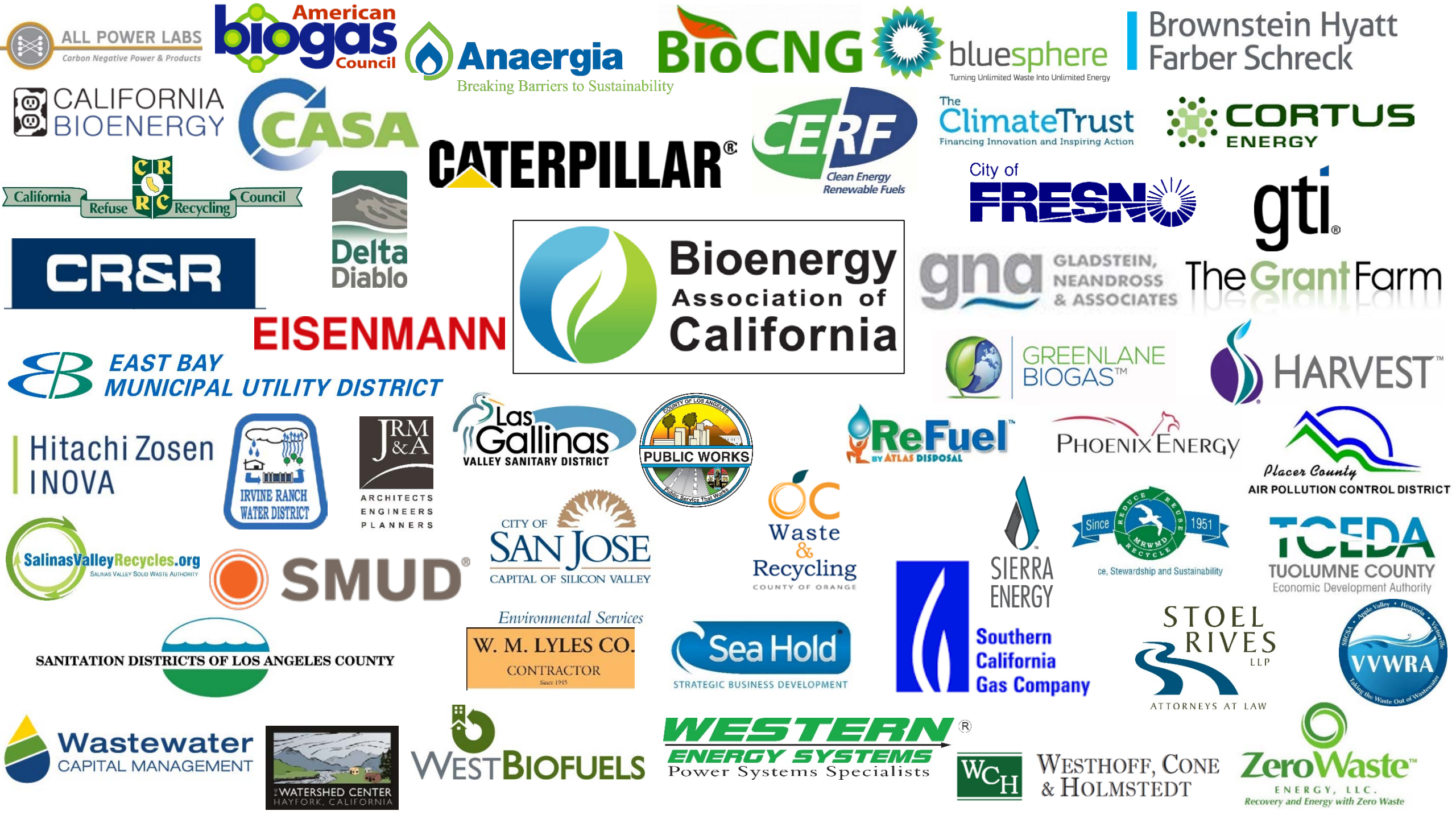
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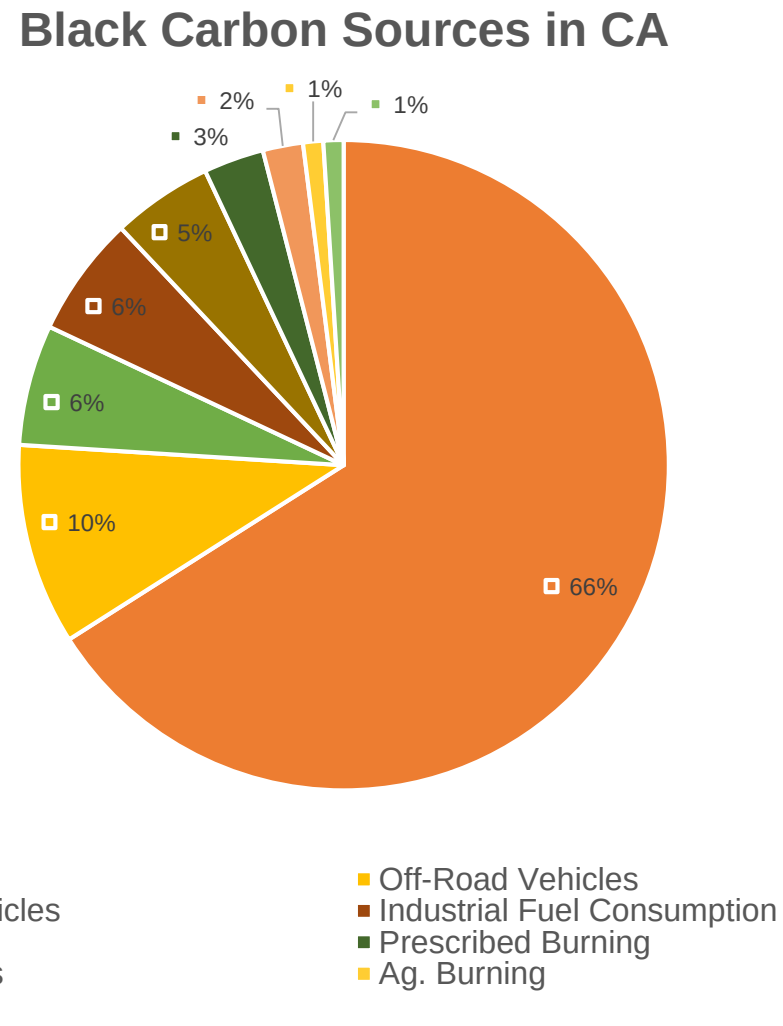
Benefits of Thermochemical Conversion

- Reduce Short-Lived Climate Pollutants
- Reduce catastrophic wildfire
- Meet 75% organics diversion requirement
- Protect air and water quality
- Produce renewable gas, fuels, power, hydrogen, biochar

More than 100 Million Dead Trees in California = State of Emergency

Reduce Wildfire and Black Carbon Emissions

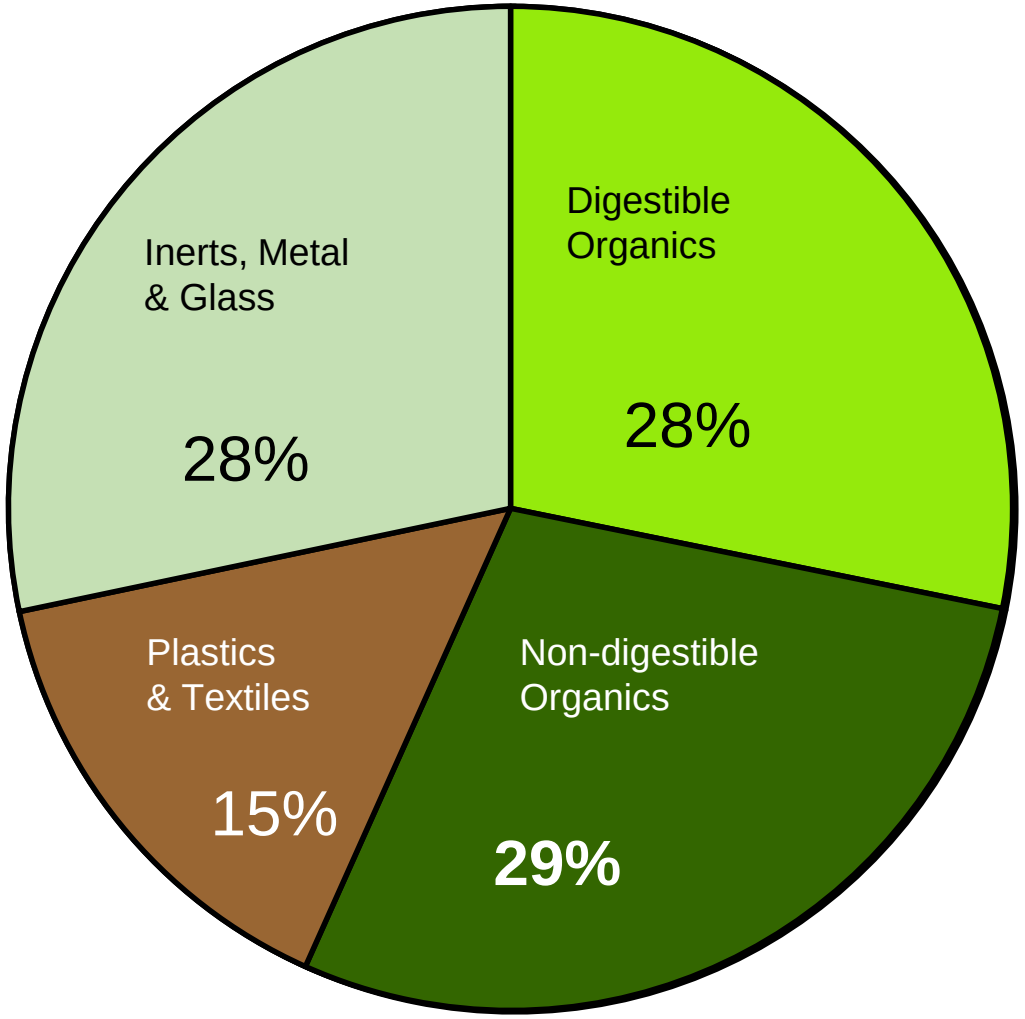


- BC = 900 – 3,200 x more potent than CO_2
- ~66% comes from wildfire in CA
- Major source of air pollution, property damage, rainfall disruption, crop and forest damage

Reduce Urban and Agricultural Waste

- Open field burning or landfilling of agricultural waste
- Urban wood waste, construction debris, non-digestible organics

Largest share of landfill waste = non-digestible organics



Source: CalRecycle 2008 & 10

Improve Soils and Water Conservation

- Biochar provides:
  - ➢ Carbon sequestration
  - ➢ Water conservation
  - ➢ Organic soil amendment

Feedstock	Amount Technically Available	Billion Cubic Feet of Methane	Gasoline Gallon Equivalents
Agricultural Residue (Lignocellulosic)	5.4 M BDT	31.55	272 million
Animal Manure	3.4 M BDT	19.7	170 million
Fats, Oils and Greases	207,000 tons	6.5	56 million
Forestry and Forest Product Residue	14.2 M BDT	82.36	710 million
Landfill Gas	106 BCF	53	457 million
Municipal Solid Waste (food, leaves, grass)	1.7 M BDT	18.44	159 million
Municipal Solid Waste lignocellulosic fraction)	10.5 M BDT	60.9	525 million
Waste Water Treatment Gas	11.8 BCF	7.7	66 million
FUEL POTENTIAL		**280.15**	**2.415 billion**

62% of organic feedstock in CA is not suitable for AD
(≈ 175 billion scf of methane/year)

Barriers to Thermochemical Conversion

- Public misconceptions
- Policymaker biases
  - ➢ Technology bias
  - ➢ Lack of incentives
- Few commercial projects in California
- No pipeline access
- Difficulty connecting to grid

Existing Policies to Promote TCCT's

- SB 1122 / BioMAT Program
- EPIC (Electricity Program Investment Charge)
- Governor's Emergency Order on Tree Mortality
- SB 1505 – 33% Renewable Hydrogen
- SB 1383 (Lara, 2016)

Pending Policies / Legislation

- Forest Carbon Plan
- SB 840 (revised pipeline biogas standards)
- SB 100 (de León)
  - Establishes 100% RPS
  - Corrects definitions of “biogas” and “biomethane”
  - Creates definition of “renewable gas”
  - Adds “organic byproducts of anaerobic digestion” to RPS
  - CPUC must consider renewable gas procurement standard
  - CPUC must facilitate fueling heavy duty trucks with renewable gas

Case Study

- UC San Diego & West Biofuels, funded by the CEC's PIER program, are developing novel biogas-to-RNG conversion technology
- "*Wood Chips on the Natural Gas Pipeline - RNG Production from Biomass*"
- Building upon lessons learned from the GoBi Gas project in Sweden, the first commercial-scale system (scaled to produce 476 million scf of RNG per year)

THANK YOU

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Bioenergy Association of California