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District Heating Systems and Biofuels for California's Energy Future

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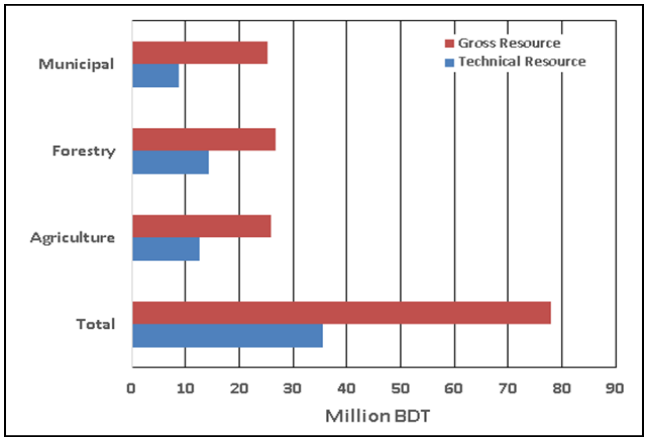
California leads the development of ambitious policies to reduce greenhouse gas (GHG) emissions. The Global Warming Solutions Act (2006) was also intended to provide a model for other states and countries. The most challenging sector is petroleum-dependent transportation. Low carbon-intensity biofuels are needed to help meet the state's GHG reduction goals for transportation. Prudent use of biomass for energy can help support multiple worthwhile public policy objectives simultaneously

Prudent use of biomass for energy can help support multiple worthwhile public policy objectives simultaneously. Published California Biomass Collaborative (CBC) estimates show that biomass is roughly evenly distributed among urban, forest and agricultural sources (See right). For policy, technical and economic reasons, much biomass is difficult to access. But if sustainable biofuel feedstocks can be produced competitively in California, new biorefineries will be built in disadvantaged areas of the state close to suitable feedstocks, and will support nearby disadvantaged populations, distributing economic benefits from the state's climate policy more equitably and effectively through job creation.

Key Points:

- ✦In-state biofuel production will increase the economic benefits from climate policy and make them more equitable
- ✦California's performance-based low carbon fuel standard (LCFS) encourages sustainability inherently because the lowest carbon intensity biofuels are also the most resource use efficient
- ✦Compared to other types of biomass, yard and food wastes from urban areas can be converted to ultra-low carbon biofuels and have the lowest fuel carbon intensity values

California Biomass Estimates



*BDT: bone dry tons per year

Implications for Policy

Collectively, new, locally optimal bioenergy systems should best be understood as pathways to important social and environmental goals that are publicly valued in their own right, including improving forest health, reducing wild-fires, increasing the sustainability of farms and the economic well-being of disadvantaged rural communities. If pathways to sustainable biofuel production are created in disadvantaged areas, the state will provide a model for many parts of the world where similar challenges exist in creating the pathways to alternative fuel production needed to meet urgent climate and social equity goals.

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District Heating for California: a Path to Green Energy and Sustainable Forest Management

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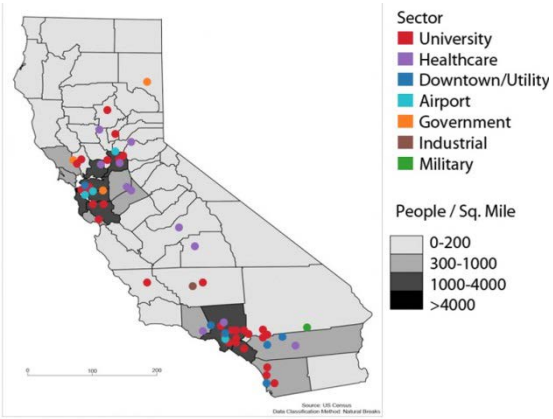
As California pursues GHG emissions reductions, policymakers can learn from the success of other countries. Sweden has reduced per capita emissions by 60% since 1970 while growing per capita GDP. Like California, Sweden had existing district heating networks in many major cities since the 1940s. In district heating, instead of every building having its own boiler, heat is produced and then distributed through pipelines to nearby buildings. District heating can be 80% more efficient than traditional heating and electric systems.

Expansion of California's district heating systems and conversion to biomass fuels will open opportunities to: diversify California's energy portfolio with expanded renewable energy options, reduce greenhouse gas (GHG) emissions, and sustainably make use of locally harvested biomass from fire-prone forests.

Key Points:

- ✦Grow existing district heating networks and convert to biomass boilers. Since the 1970s, Sweden has doubled district heating capacity and converted from oil to biomass boilers with the help of public-private partnerships. Sweden decreased its reliance on imported oil and reduced GHG emissions across energy, waste, residential, industrial and commercial sectors. More than 50% of homes and 80% of apartment buildings in Sweden are now connected to district heat
- ✦Incineration technology has improved greatly since the 1970s. Modern incinerators burn fuel more cleanly, operate under strict environmental regulations, and have improved smokestack filters. As a result of clean technology and facility design, many new incinerators are sited in residential areas and on nearby farmland. Incinerators can also be coupled with turbines for electricity production from the incineration of forest and agricultural byproducts. Some burn municipal waste, reducing landfilling.

California District Heating Networks



Implications for Policy

California is a climate action leader. While even Scandinavian countries have been unsuccessful in reducing per capita GHG emissions from transportation, district heating offers policy promise. California's ready supply of timber can be a valuable resource rather than a fire hazard. Wider adoption of district heating and conversion to biomass boilers can help California achieve its greenhouse gas reduction goals while furthering its status as a climate leader.

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