WHY BIOENERGY?

• Lowest Carbon Transportation
• Baseload renewable energy
• Reduce petroleum dependence, air and water pollution, GHG emissions
• Reduce landfilling
• Reduce toxic air contaminants, environmental justice impacts from diesel pollution
• Reduce wildfire risks and impacts
• Provide jobs and economic development in every region of the state
Organic Waste in California

• More than 500 WWTP’s
• 278 landfills
• 1600 dairies
• 16 million tons of organic waste landfilled per year
• Organic waste = 3 out of 5 top methane sources in CA
• Wildfire causes 52% of all black carbon emissions in CA
Diverted Organic Waste – Food, yardwaste, FOG, construction, soiled paper

- Could produce 492 million gge’s of carbon negative fuels or 450 MW
Landfill Gas

• Could produce 457 million gge’s or 330 MW
Livestock Waste

• Could produce 102 million gge’s or 500 MW
Wastewater Treatment Facilities

• Could produce 50-150 million gge’s or 150-450 MW
Agricultural and Forest Waste

• Could generate 982 million gge’s or > 600 MW
Bioenergy in CA can provide:

• 243 Billion cubic feet of renewable gas
• 2.1 Billion gallons of fuel (gge)
• Enough to replace 2/3 of all the diesel used in CA vehicles
• More than 10% of CA’s total electricity or natural gas needs
• Lowest carbon transportation of any kind
<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Cost Range</th>
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<tr>
<td>Gasoline</td>
<td>99.18</td>
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<tr>
<td>Diesel</td>
<td>98.3</td>
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<tr>
<td>Hydrogen from natural gas</td>
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<tr>
<td>Biodiesel from Midwest soy beans</td>
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<tr>
<td>Corn ethanol</td>
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<td>Natural Gas</td>
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<td>Sugarcane ethanol</td>
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<td>Hydrogen</td>
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<td>Electric vehicles</td>
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<td>Renewable Diesel</td>
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<td>Landfill gas</td>
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<td>Dairy Biogas</td>
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<td>Wastewater biogas (large facilities)</td>
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<td>Biogas from diverted food and green waste</td>
<td>- 15</td>
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Policy Drivers for Bioenergy

• AB 32 / SLCP’s
• LCFS and RINs
• RPS / SB 1122
• Waste reduction goals
• Wildfire risks
• Wastewater treatment
Challenges for Bioenergy

- Cheap fossil fuel gas
- Utility Resistance and CPUC rules
- No long term contracts for LCFS fuels
- Stringent / expensive pipeline standards
Renewable Gas Standard (RGS)

• Require a percentage of pipeline gas from renewable sources
• Provide market certainty
• Build on proven success of RPS in electricity sector
Renewable Gas Standard (cont’d)

• Recommendation:
  ➢ 1% RGS by 2020
  ➢ 3% RGS by 2023
  ➢ 5% RGS by 2025
  ➢ 10% RGS by 2030

• Applies to all retail gas sellers

• Must meet requirements of AB 2196 (additionality, instate benefits)
THANK YOU

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