

Uses Today and Tomorrow: Powering Homes, Business, and Vehicles

December 12, 2016

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Use and Transition

- Use
- Transition
 - How will renewable and GHG emission reduction goals affect use of natural gas?
 - How are we responding to decreased emphasis on natural gas?
 - Renewable Natural Gas – where does it come from, who can use it, and current challenges?

USES

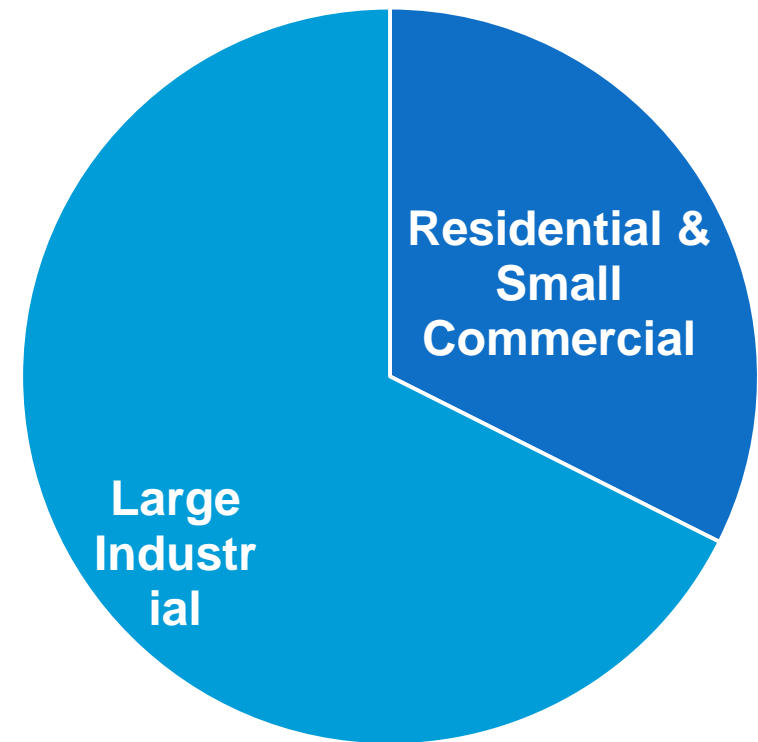
Natural Gas use in California is regulated by the Public Utilities Commission

- Use

- ~32% residential & small commercial
- ~68% large industrial

- Supply

- 35% Southwest U.S.
- 16% Canada
- 40% Rocky Mountains
- **9% California**



Natural gas is being replaced with biogas to reduce fossil fuel based GHG emissions

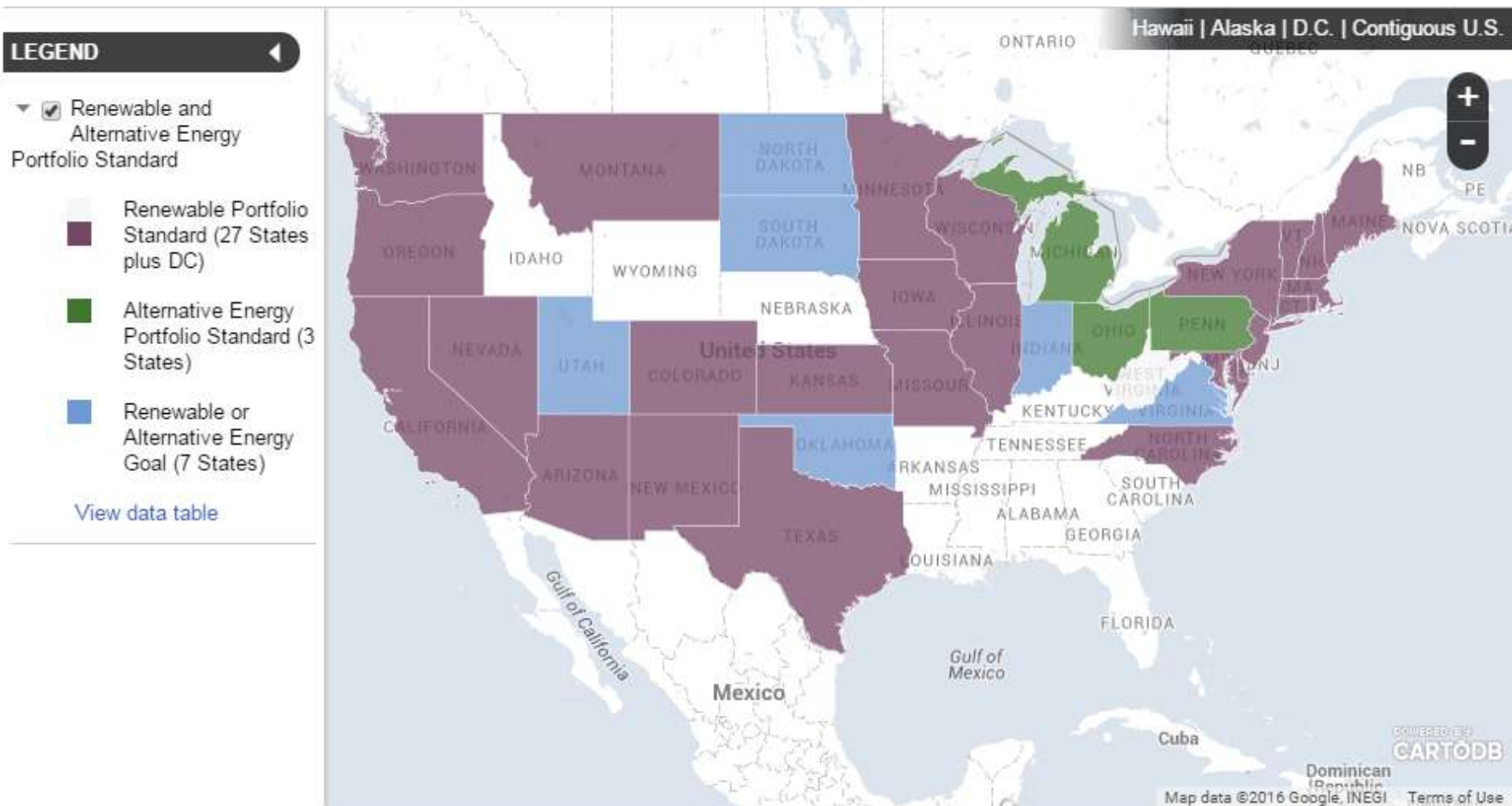
TRANSITIONS

Governor's “five pillars” to achieve GHG reductions of 40% below 1990 levels by 2030

- 50% renewable energy
- Reduce short-lived climate pollutants
- 50% reduction in petroleum use in vehicles
- Double energy efficiency in existing buildings
- Increase carbon sequestration on farms, rangelands, forests, and wetlands

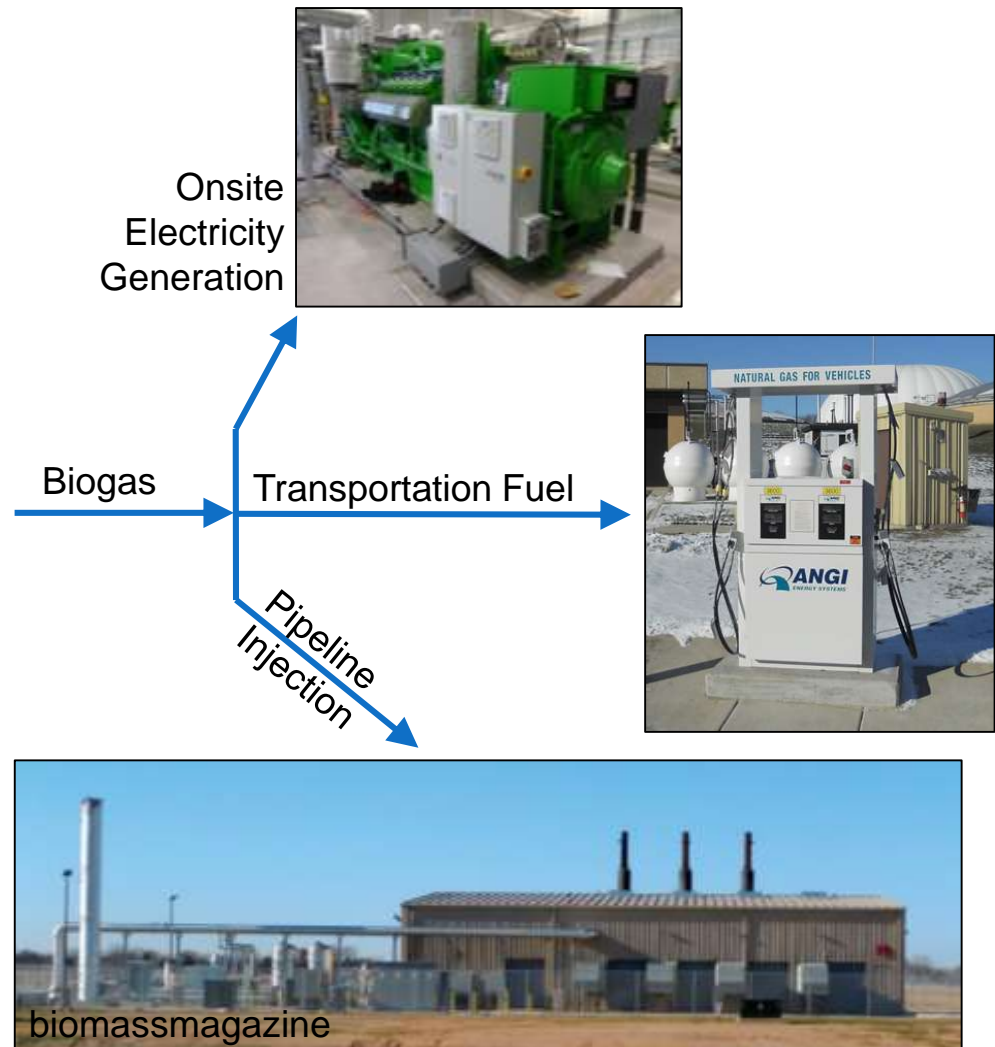


Most states have renewable/alternative energy goals & 34 have climate plans



Renewable natural gas is a byproduct that provides multiple uses and benefits

- Offsets fossil fuel based electricity and transportation fuel
- Reliable, renewable energy/fuel source
- Biogenic source of greenhouse gas (GHG) emissions (i.e., reduces fossil based GHGs)



Renewable natural gas (or biogas) is generated at...



Wastewater Treatment
Plants



Landfills



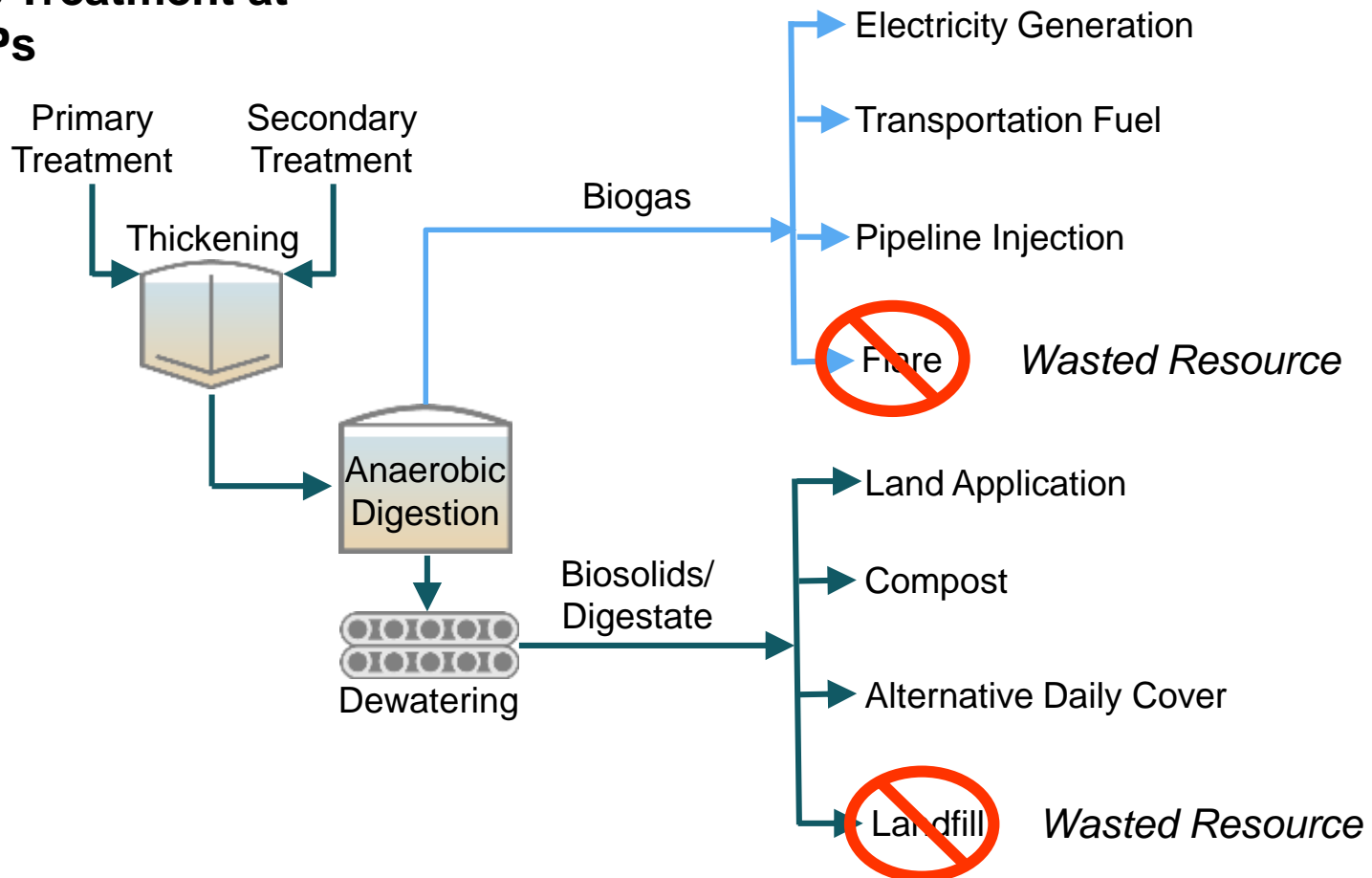
Other (food)



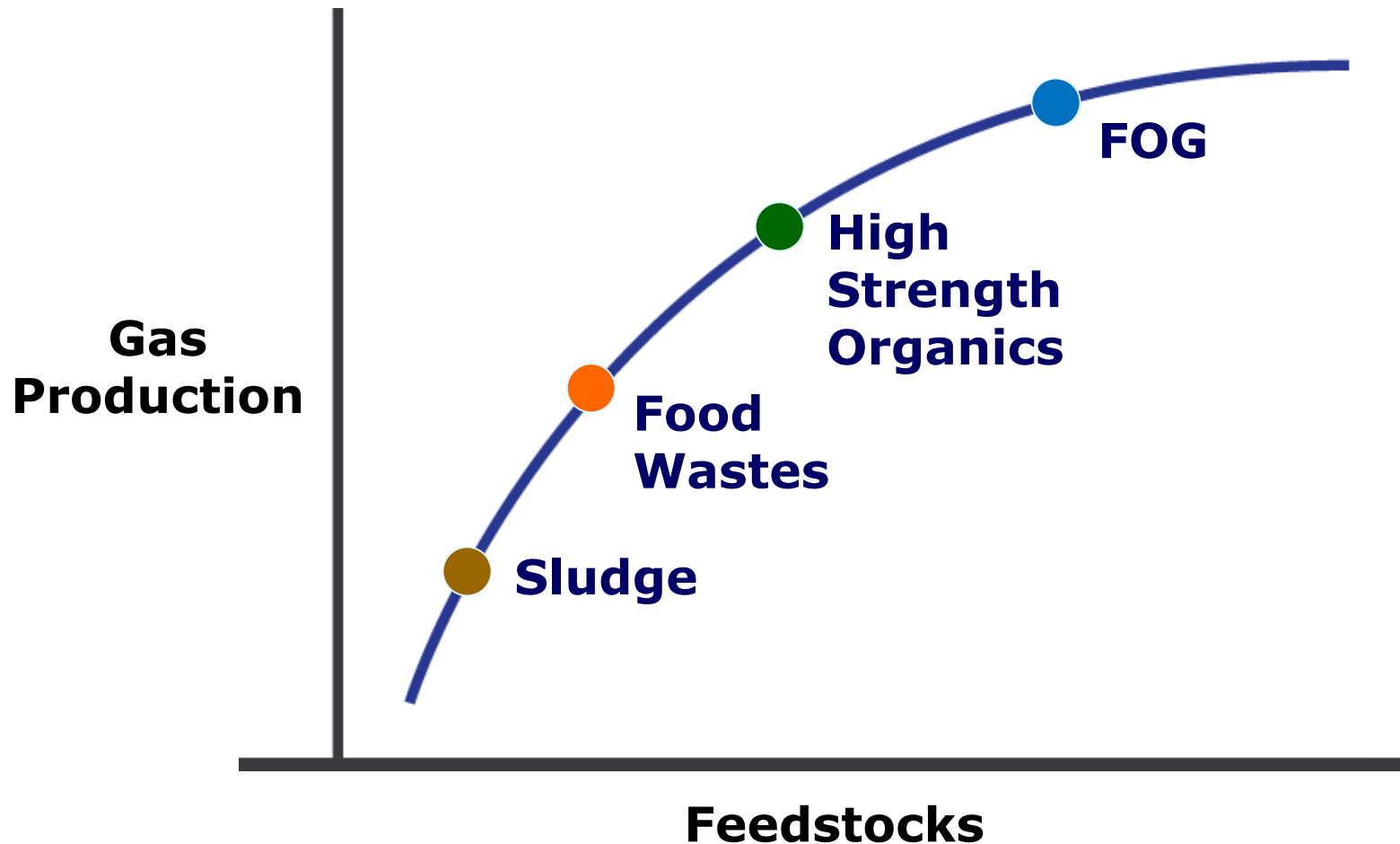
Dairy Operations

Effective use of biogas depends on the plant's operations & community's needs

Solids Treatment at WWTPs



Co-digesting additional organic feedstock increases the net carbon sink



The additional biogas can be conditioned for pipeline injection or vehicle use

- Avoids combustion onsite
- Extremely low carbon intensity fuel
- Eligible for funding incentives aiming to reduce GHG emissions



Barriers exist that impede the use of renewable natural gas

- High cost of new infrastructure for the conditioning of biogas to renewable natural gas
- High cost of interconnection for pipeline injection
- Lack of alternative funding available
- Building market for compressed natural gas as a transportation fuel

Use of renewable resources supports goals to increase a community's resilience

- National
 - Renewable Fuel Standard
 - Clean Power Plan (on hold)
- State
 - Renewable Portfolio Standards
 - Low Carbon Fuel Standards
- Local/City
 - Climate Action Plans
 - Mayor's Climate Protection Agreement
 - 100 Resilient Cities



Thank you!



Questions?

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