

Kore

Kore Infrastructure

*Kore Pyrolysis Offers a
Flexible Platform for
Renewable Energy
Production*

Presented to:

**California Bioresources
Alliance**

November 9, 2022



Kore

Kore Demonstration Facility Is Located in Downtown Los Angeles on Site Owned by SoCalGas



Kore Facility

Feedstock processing:
24 tons/day

*Project supported
technically and
financially by:*

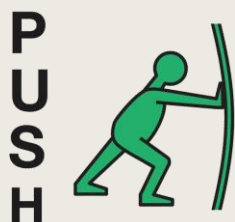


A  Sempra Energy utility®



Existing Legislation Provides a Push and Pull for Renewable Energy

SB 1383



Tree pruning
and removal



Biosolids



Nut shells



Green waste



Conversion
Technology



Renewable
Hydrogen

**LCFS
& IRA
credits**



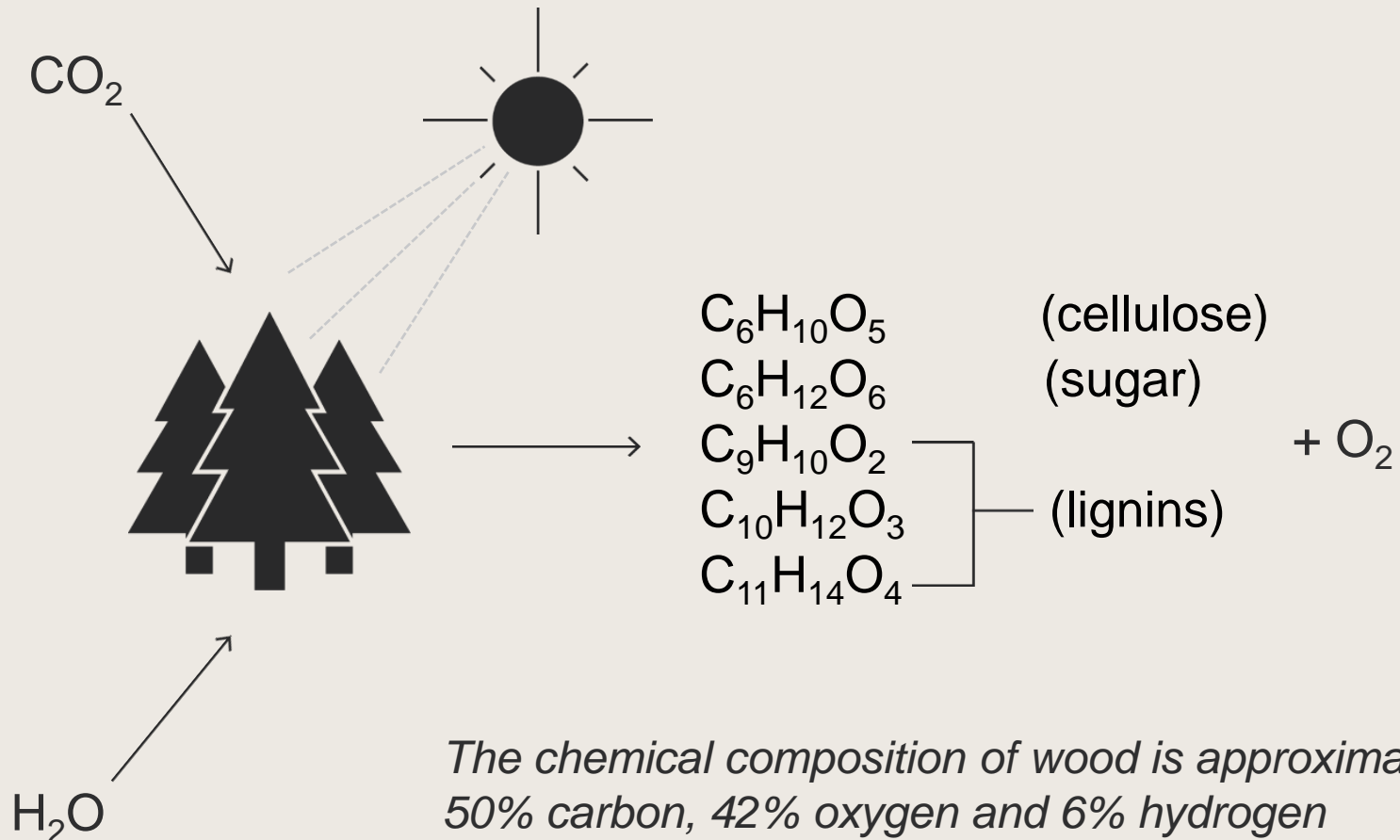
Lower Carbon
Intensity Fuels

California Generates over 100,000 tons/day of “waste” feedstock that can be converted into energy

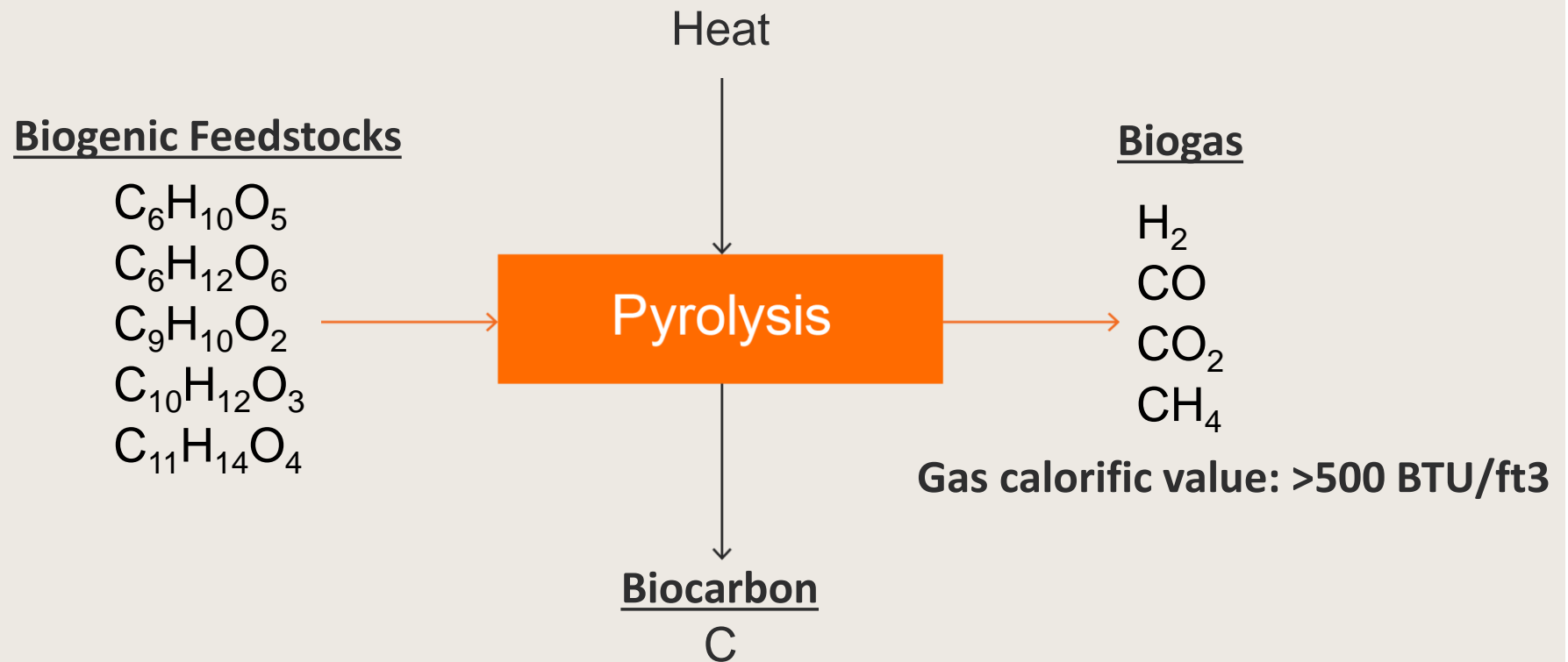
Feedstock	Amount Technically Available per Year
Animal Manure	3.4 million BDT
Fats, Oils, and Greases	207,000 tons
Municipal Solid Waste (food, leaves, grass)	1.2 million BDT
Municipal Solid Waste (lignocellulosic fraction)	6.7 million BDT
Agricultural Residue (lignocellulosic fraction)	5.3 million BDT
Forest, Sawmill, Shrub & Chaparral Residues	26.2 million BDT
Total	42.8 million BDT

Sources: Rob Williams and Stephen Kaffka, UC Davis, presentation to the California Energy Commission on January 30, 2017; Lawrence Livermore National Lab assessment of forest, sawmill, shrub & chaparral residues

Biogenic feed originates with the photosynthetic combination of atmospheric CO_2 with H_2O to form a carbohydrate and oxygen



High-temperature “slow” pyrolysis to convert biogenic feed to gasses and carbon



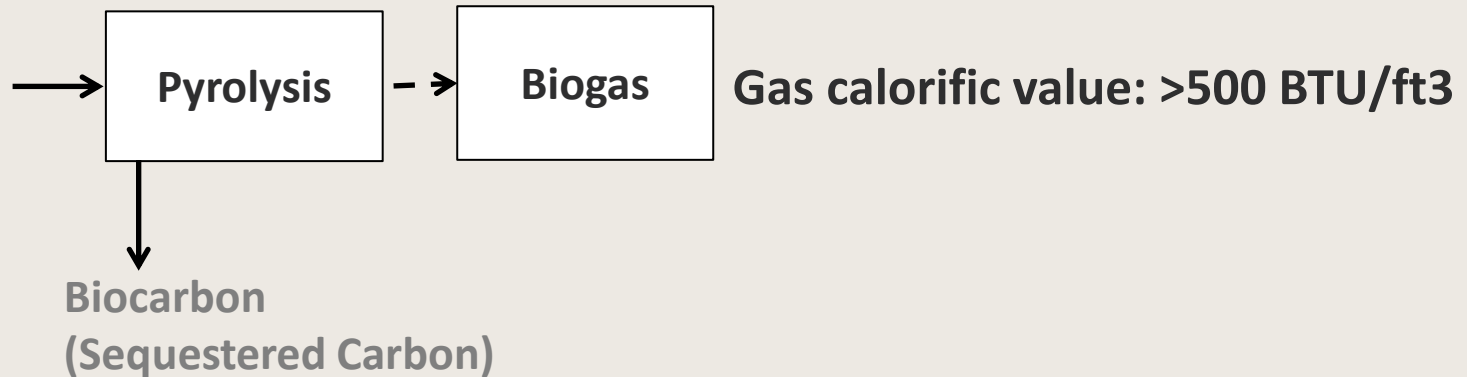
The gas composition and biocarbon (C) properties depend upon feedstock composition, pyrolysis temperature, and gas and solid retention time

*Pyrolysis Converts Biomass
into a Range of Renewable
Energy Products*

Starting with Biogas Provides a Flexible Renewable Energy Platform

Biogenic feedstock

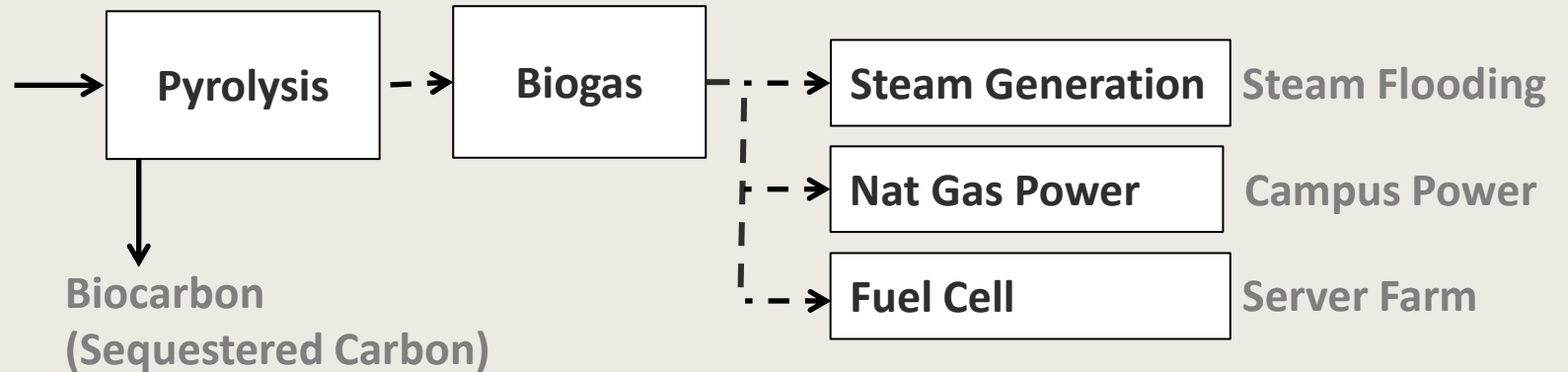
Ag Residuals
Demo wood
Biomass from forest
management



Biogas Can Replace Natural Gas in Many Applications

Biogenic feedstock

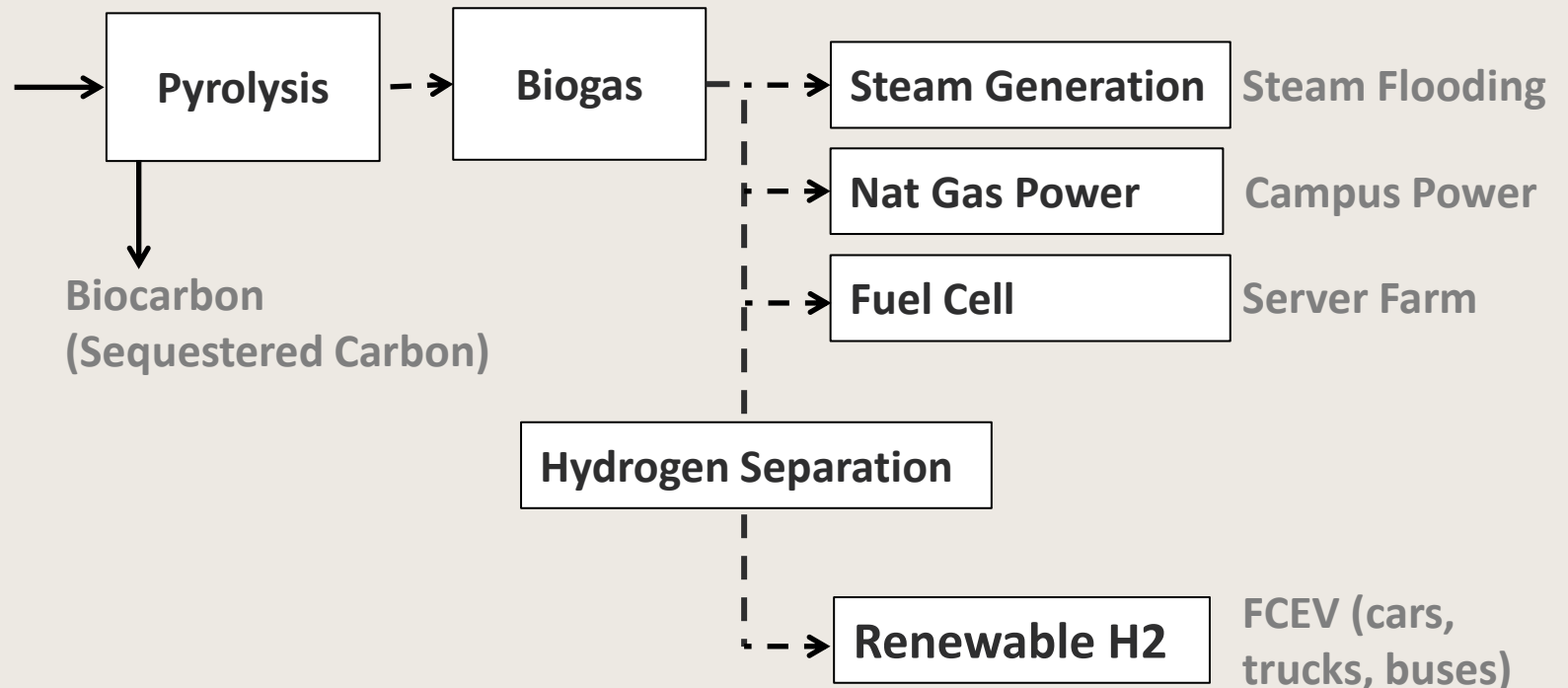
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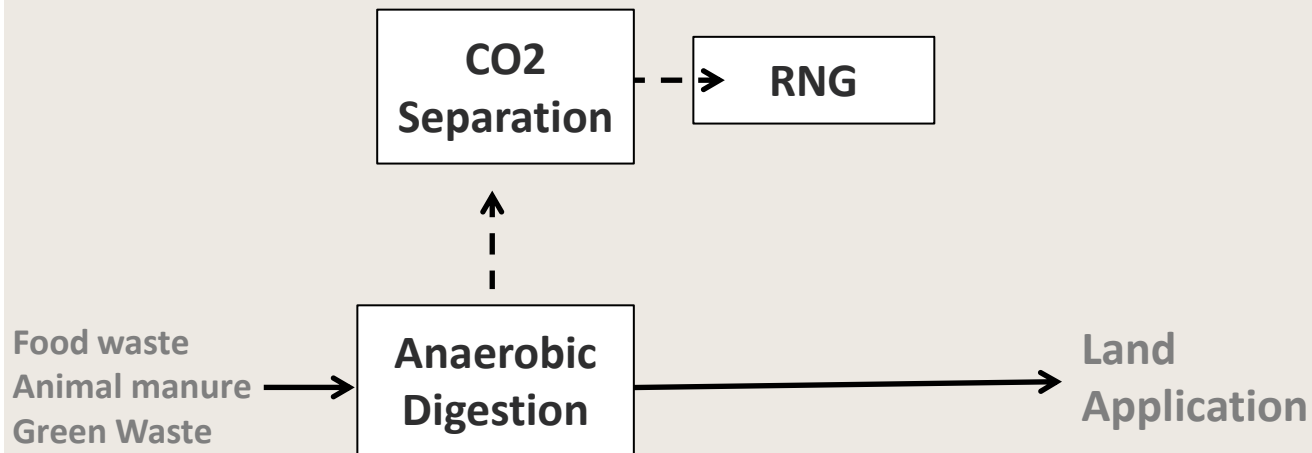
Biogas Can Also Be Upgraded to Renewable Hydrogen for Fuel Cell Electric Cars, Trucks, and Buses

Biogenic feedstock

Ag Residuals
Demo wood
Biomass from forest
management



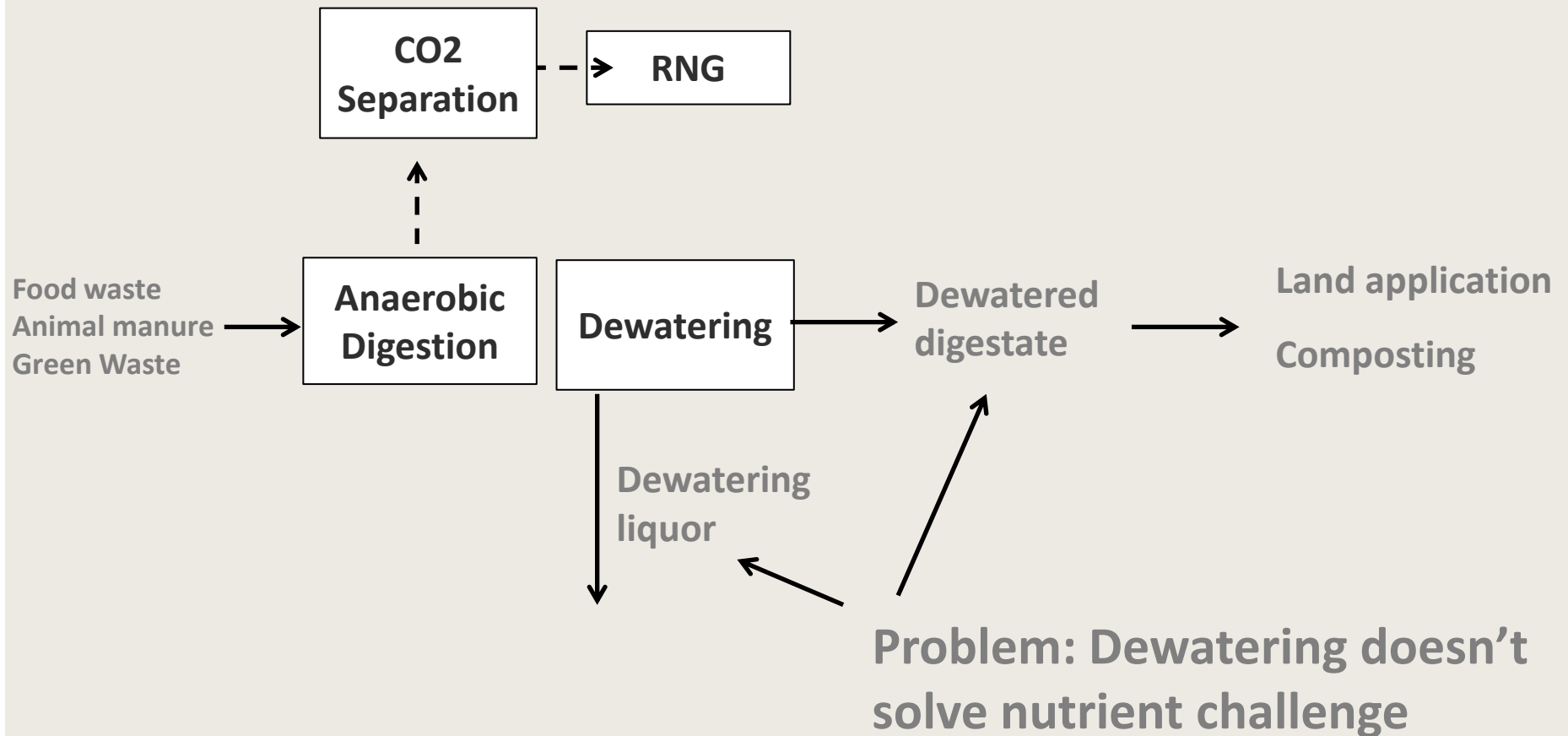
Nutrient removal is an increasing problem for anaerobic digesters with limited options for nutrient disposal



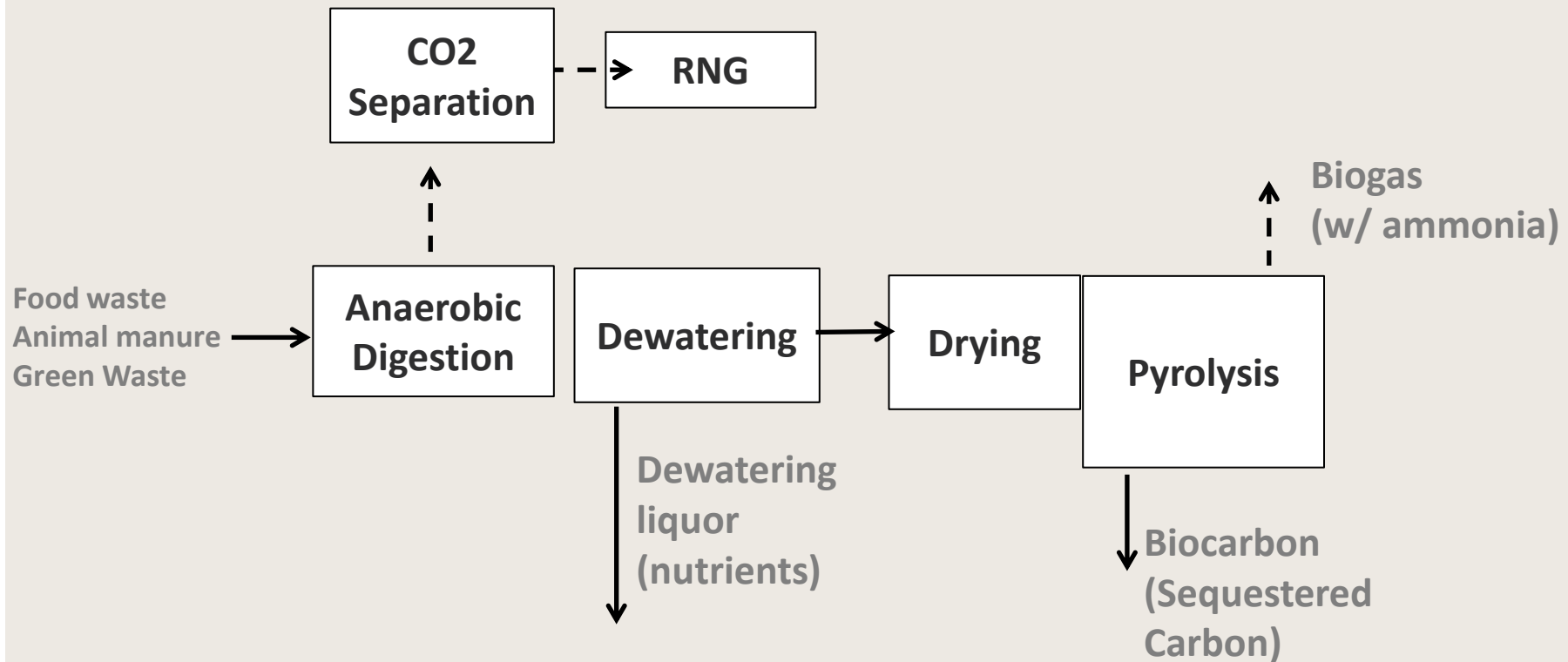
**Problem: Excess nutrients can
contaminant ground and surface water**

*Kore Pyrolysis Complements
Anaerobic Digestion to
Increase RNG Production*

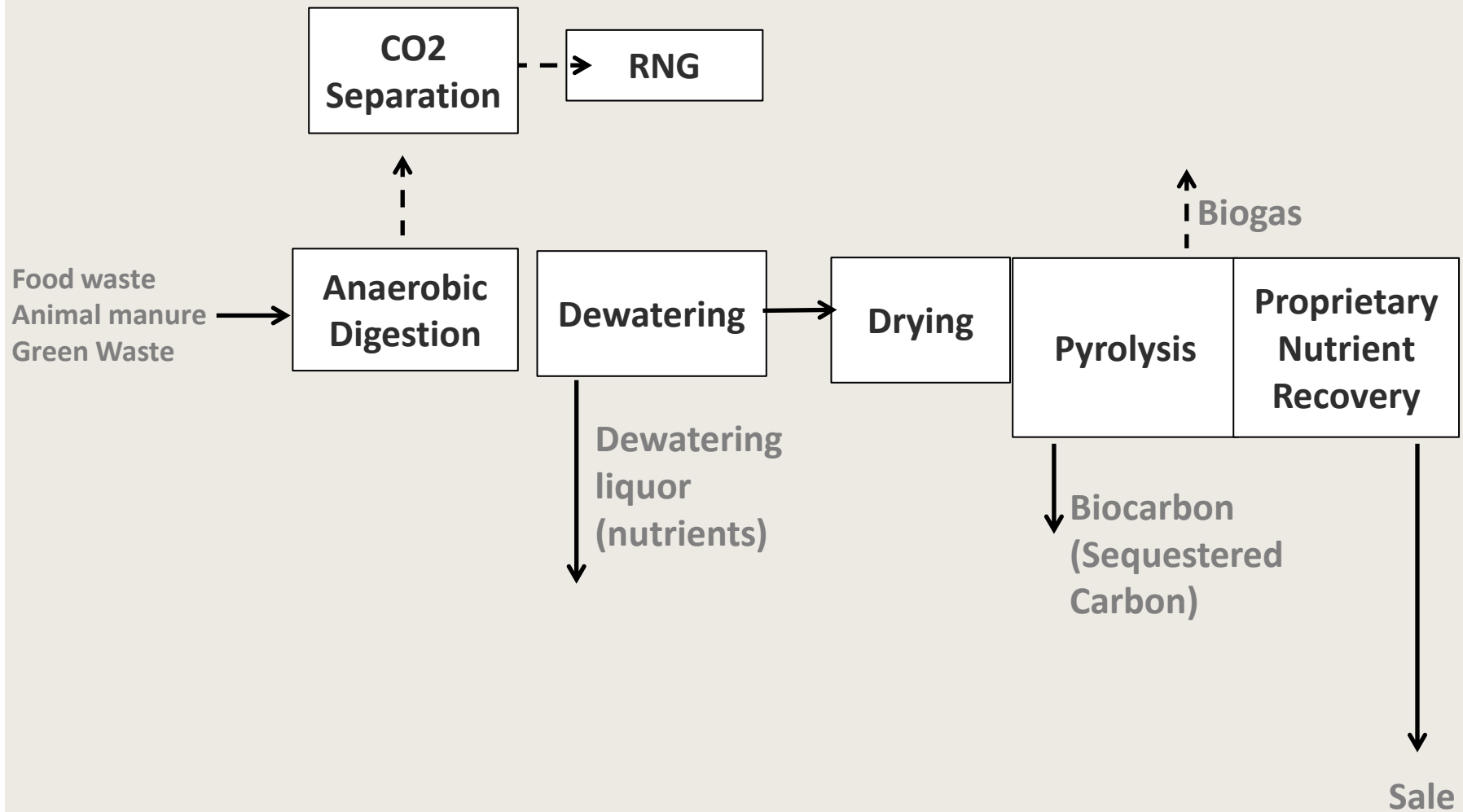
Dewatering does not solve nutrient problems



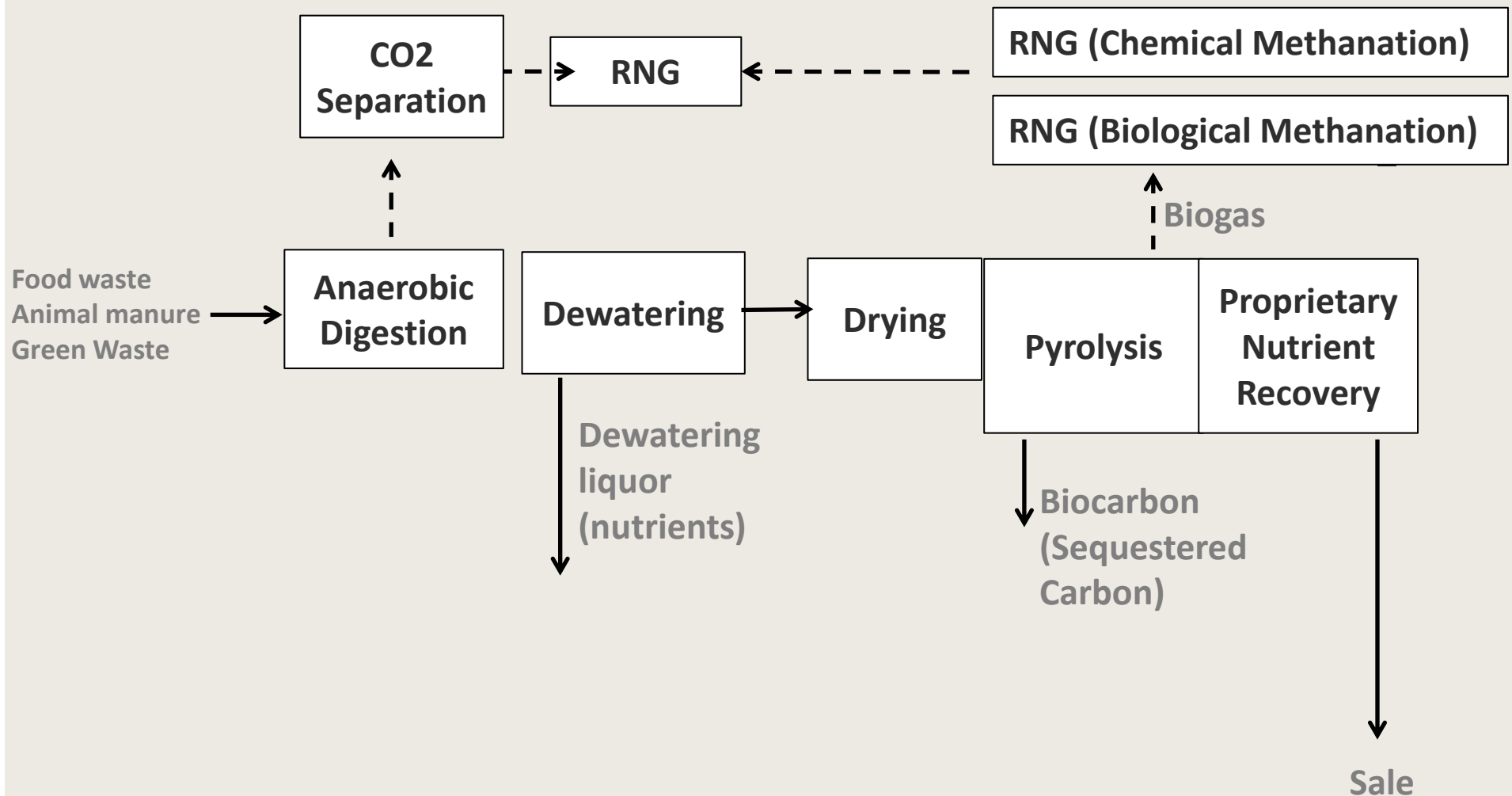
Pyrolysis solves solids management challenge, but nitrogen is transferred to the gas



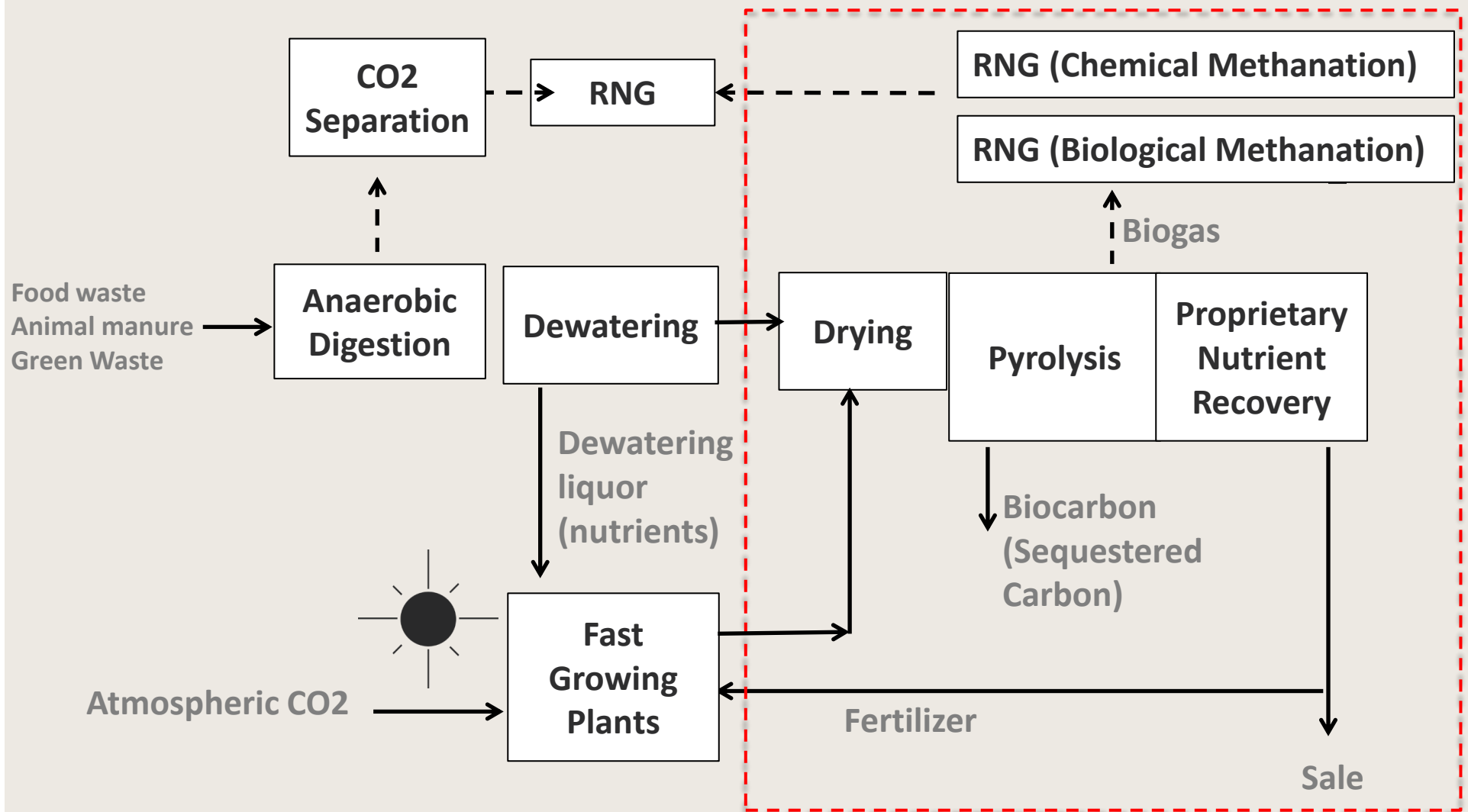
Recovery from the gas becomes the nitrogen sink



Biogas can increase RNG production



Nitrogen can be leveraged to significantly increase RNG production using fast growing plants



Elemental Carbon Char (Biocarbon) Is the Key to Carbon Management



Figure 1: Biochar produced from organic matter. Source: Hans Erken, Flickr.

- Soil Amendment
- Fossil coal substitute for difficult to decarbonize industries
- Carbon negative attributes can be sold as voluntary CO₂ offsets

Biocarbon as Soil Amendment Has Many Benefits



- Reduced Irrigation (less water)
- Improved Nutrient Retention (less fertilizer)
- Reduced Nutrient Runoff (less non-point pollution)
- Enhanced microbial activity (healthier soil)
- Increased yields

Carbon Sequestration

Biocarbon Can Substitute for Fossil Coal in Difficult to Decarbonize Industries



California cement manufacturers use 900,000 tons of coal and petroleum coke, which can be replaced with carbon neutral “biocarbon”.
SB 596 – Low Carbon Cement Standards

The Technology Described Is Operating at Commercial-Scale in Downtown Los Angeles



*Project supported
technically and
financially by:*



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