Oregon Department of Energy

Leading Oregon to a safe, clean, and sustainable energy future

The Biogas / RNG Inventory – Advisory Committee

Meeting 2

Dan Avery
November 7, 2017

SB 334 – RNG Advisory Committee

Goals for today

Signing the charter

Review and incorporating comments in the report outline in order to generate a 2nd draft for review

Clarify the technical subgroups and their assignments

Begin a laundry list of the general risk categories.

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Charter

Renewable Natural Gas Inventory

SB 334 (2017)

Advisory Committee Charter

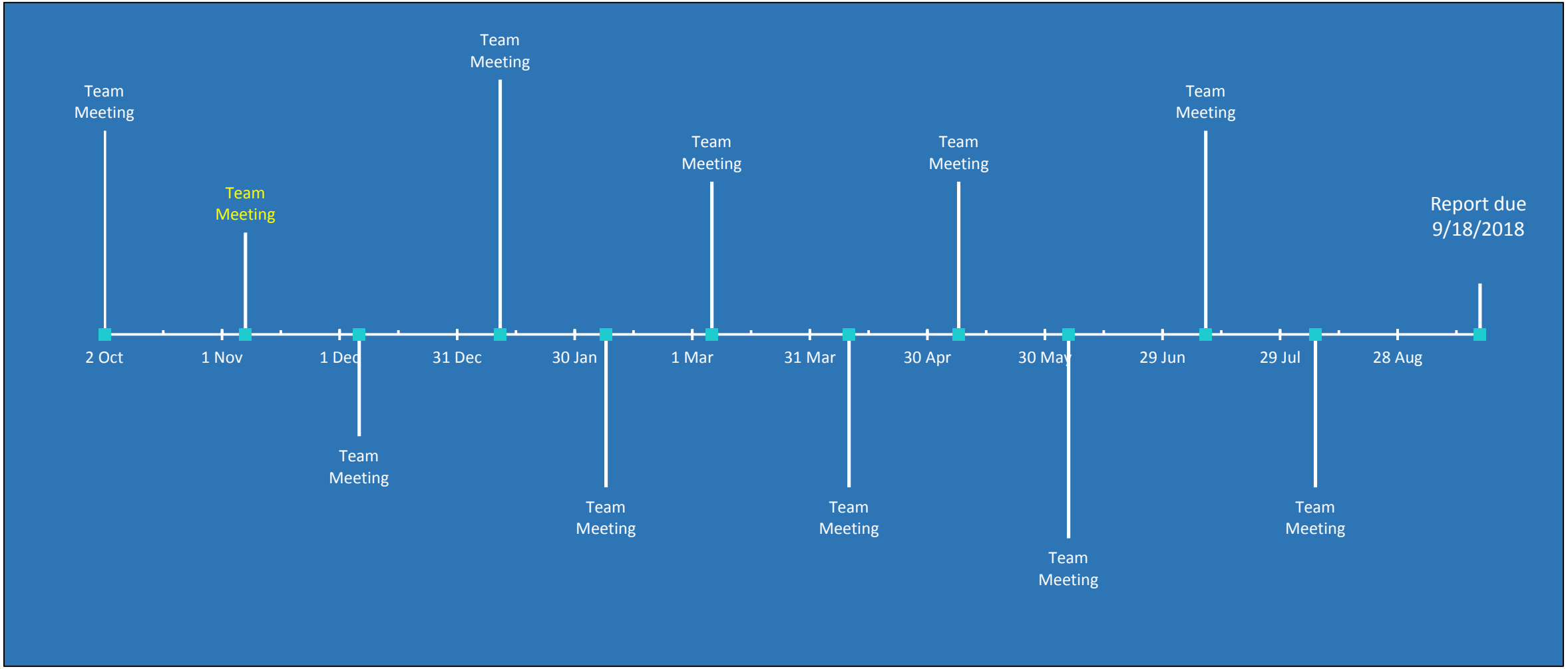
I. Background

The Advisory Committee is formed as directed by the Oregon Legislature in SB 334 (2017) by the Oregon Department of Energy (Department) to assist the Department in the development of an inventory of resources that would be involved in the production of biogas and renewable natural gas. The Committee will assist ODOE in developing this report by participating in discussions about the development of the inventory and characterizing the opportunities and challenges present in the biogas and renewable natural gas industry, providing technical expertise, and researching various relevant topics.

The Committee will assist the Department as described by the Legislature in SB 334 below:

> *Section 1. (4) The department shall appoint an advisory committee to assist in developing, maintaining and periodically updating the inventory required by this section. The committee must include but not be limited to persons familiar with the renewable natural gas industry. The committee shall make recommendations to the department:*
>
> *(a) Regarding the identification and removal of barriers to producing and utilizing biogas and renewable natural gas in this state as a means toward providing the greatest feasible reductions in greenhouse gas emissions and improvements in air quality;*
>
> *(b) On establishing policies to promote renewable natural gas; and*
>
> *(c) On any other matters related to this section, as requested by the department.*

Calendar 1



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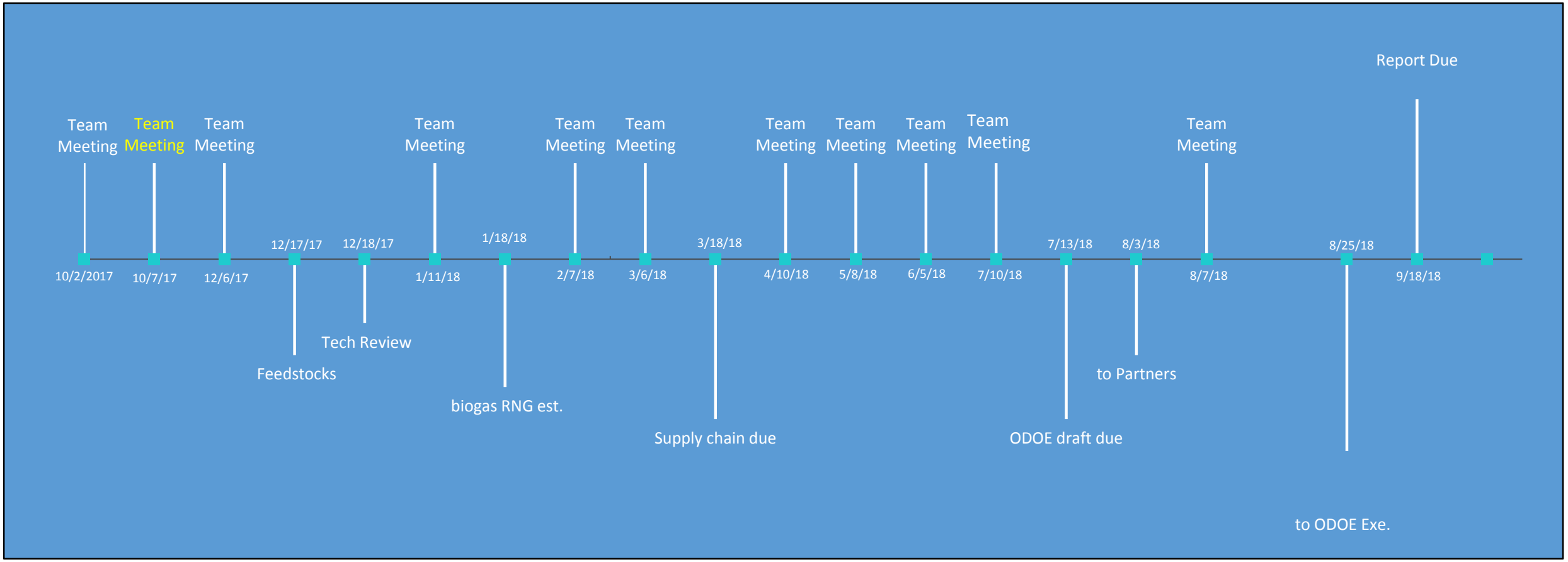
Calendar 2



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Chapter 1

A review of all the existing technologies available to this state for the conversion of biomass to biogas and RNG, including but not limited to anaerobic digestion and thermal gasification.

Goal: define available and near future technology to create biogas, RNG. Establish conversion rates (feedstock to biogas to RNG)

Work product: A written technical review on Thermal Gasification, Anaerobic Digestion, and other potential technologies (hydrothermal processing?) as well as biogas clean up – this is a found literature review only. Generate a table that presents the estimated range of conversion rates for various raw material to biogas by the different technologies. A second table will show the resulting amount of RNG after biogas is cleaned to pipeline standards. At each step identify where there are losses of gas and losses through conversion efficiency.

Group Questions: How much detail and how deep should we go for each technology? Are there other gas production technologies we should investigate and where do we draw the line for this initial 2018 report? Should we present a variety of pipeline gas standards at this point or elsewhere in a separate discussion?

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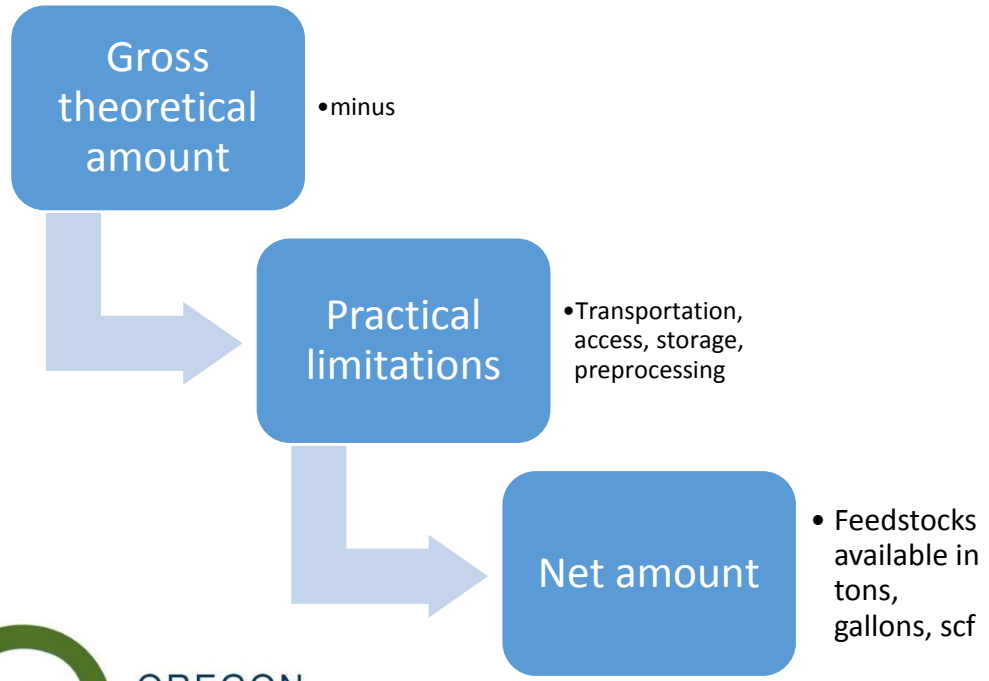
Chapter 2

Section 1 (2) (a) A list of potential biogas and renewable natural gas sources in this state and the estimated potential production quantities available at each source

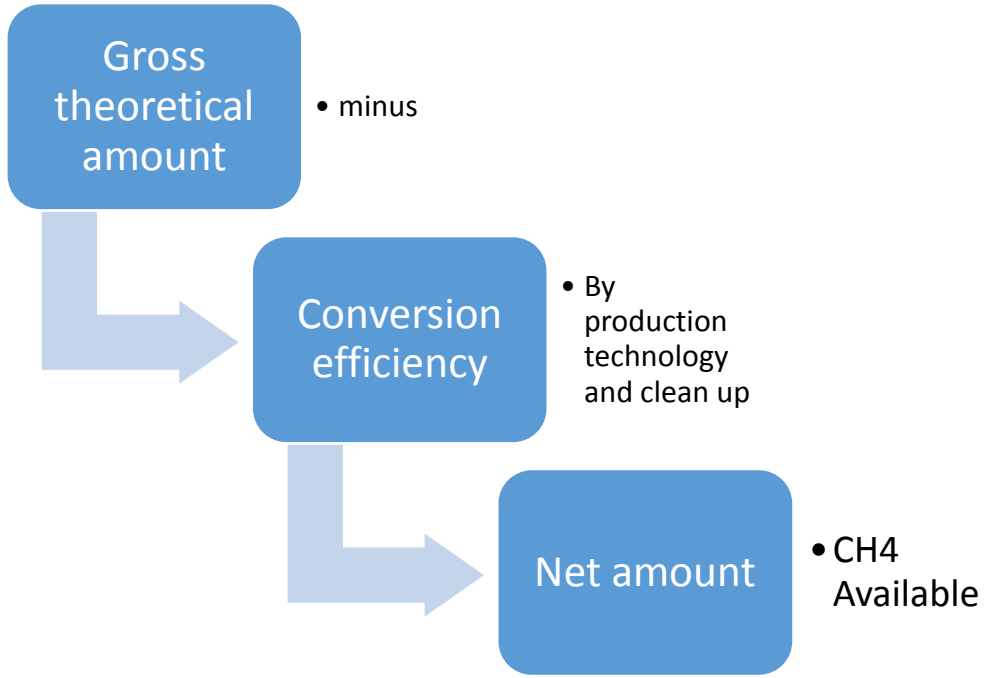
(b) An estimated energy content of listed potential biogas and renewable natural gas sources:

Feedstocks



By county and feedstock

CH4 scf and BTUs



By county and feedstock

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Chapter 2 table (table numbers are fictional)

County	Feedstock	Gross Volume	Net Volume	Net BTUs	CH4 scf	Biogas
Lincoln	Ag Manure	100,00 wet tons	30,000 tons	19,617,000,000	19,617,000	30,180,000
	Food Waste	500 wet tons	300 tons			
	WWT	1M gallons	1M gallons			
	LF	10 million tons				
	Forest Residuals	9 million bone dry tons				
	Agricultural Residuals	3 million bone dry tons				
County total						

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County	Feedstock	Gross volume	Supply chain losses	Net Volume	Gross BTU	Net BTU	Gross CH4	Net CH4	
Lincoln	Ag Manure	100,000	Collection, Storage, Gas conversion Downstream transport	30,000	65,390,000,000	19,617,000,000	100,600,000	19,617000	
	Food Waste								
	WWTP								
	LF								
	Forestry Residuals								
	Agriculture Residuals								

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Chapter 2-1

An inventory of all biogas and RNG feedstock resources available in the state along with potential production quantities obtainable for each feedstock.

Goal: Describe gross volume of individual feedstocks available in Oregon.

Work product: A spreadsheet at the county scale, by feedstock type showing the gross amount of feedstock theoretically available. An example is the NREL report and the CA report. Show data sources, all assumptions, and examples of calculations for various quantities.

Group Questions: Limit feedstocks to what types, as there are many potential sources and types? What kind of ranges should we use for the values?

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Chapter 2-2

An estimate of the gross energy content of each source identified above.

Goal: Describe energy content of individual biogas feedstocks.

Work product: Spreadsheet or table showing the estimated gross energy (BTUs/time) by feedstock type, again similar to NREL biomass data. This represents the theoretical gross amount of energy available before practical limitations like feedstock access, transportation, and cost are applied

Group Questions: Should this just be a simple table showing CH4 content of one ton of manure, or one ton of average food waste, or BTUs/Therms/GJ? How should we parse this information to maximize the educational benefit to our intended audience?

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Chapter 2-3

An estimated potential production of Biogas and RNG in Oregon.

Goal: How much biogas and RNG can be made for available feedstock

Work product: Spreadsheet or table showing the estimated gross and net energy (BTUs/time) by feedstock type, again similar to NREL biomass data. This represents the theoretical gross amount of energy available before practical limitations like feedstock access, transportation, and cost are applied

Group Questions: Should this just be a simple table showing CH4 content of one ton of manure, or one ton of average food waste, or BTUs/Therms/GJ? How should we parse this information to maximize the educational benefit to our intended audience?

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Chapter 2-4

An estimated volume of the practical amount of biogas and then RNG.

Goal: estimate the practical amounts of RNG that can be produced. Outline supply chain losses and limits.

Work product: Develop a table showing current and potential volumes of biogas - to RNG. Identify potential losses of gas due to increased steps in the supply chain when taking biogas to RNG. Columns of the table will show practical considerations that result in reductions of amounts of gas.

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Chapter 2-5

An estimated volume of the practical amount of RNG as a transportation fuel

Goal: Identify the practical amount of RNG that enter the transportation sector

Work Product: A table showing ranges of CNG available for use as a transportation fuel.

Group Questions: Based on current infrastructure (fueling stations) and NG pipeline access?

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Chapter 2-6

An estimated production potential of RNG as a percentage of the stationary fuel used by residential, commercial, and industrial consumers.

Goal: describe the amounts of RNG that could be supplied to be used as stationary fuel.

Work product: A spreadsheet listing amounts of RNG after reductions based on supply chain limitations. This table / spreadsheet will show losses attributable to the stationary fuels supply chain

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Chapter 3

A list of existing biogas production sites within the state, including their location and an assessment of the supply-chain infrastructure at each site.

Goals: examine adjacency to identify infrastructure feasibility assessment questions and outcomes. The second goal is to build a supply chain assessment of real projects.

Work product: A GIS dataset (geodatabase or shapefile) with locational information using the same data types as in the general inventory. The supply chain analysis is a much more complex task and will be in the form of a flow chart and text document showing all the steps from raw material to RNG and then the steps needed to get the RNG from the production location to the end user.

Group Questions: Building a GIS / supply chain assessment of a real project is a sensitive issue. There are real and perceived privacy concerns. How should we address this issue?

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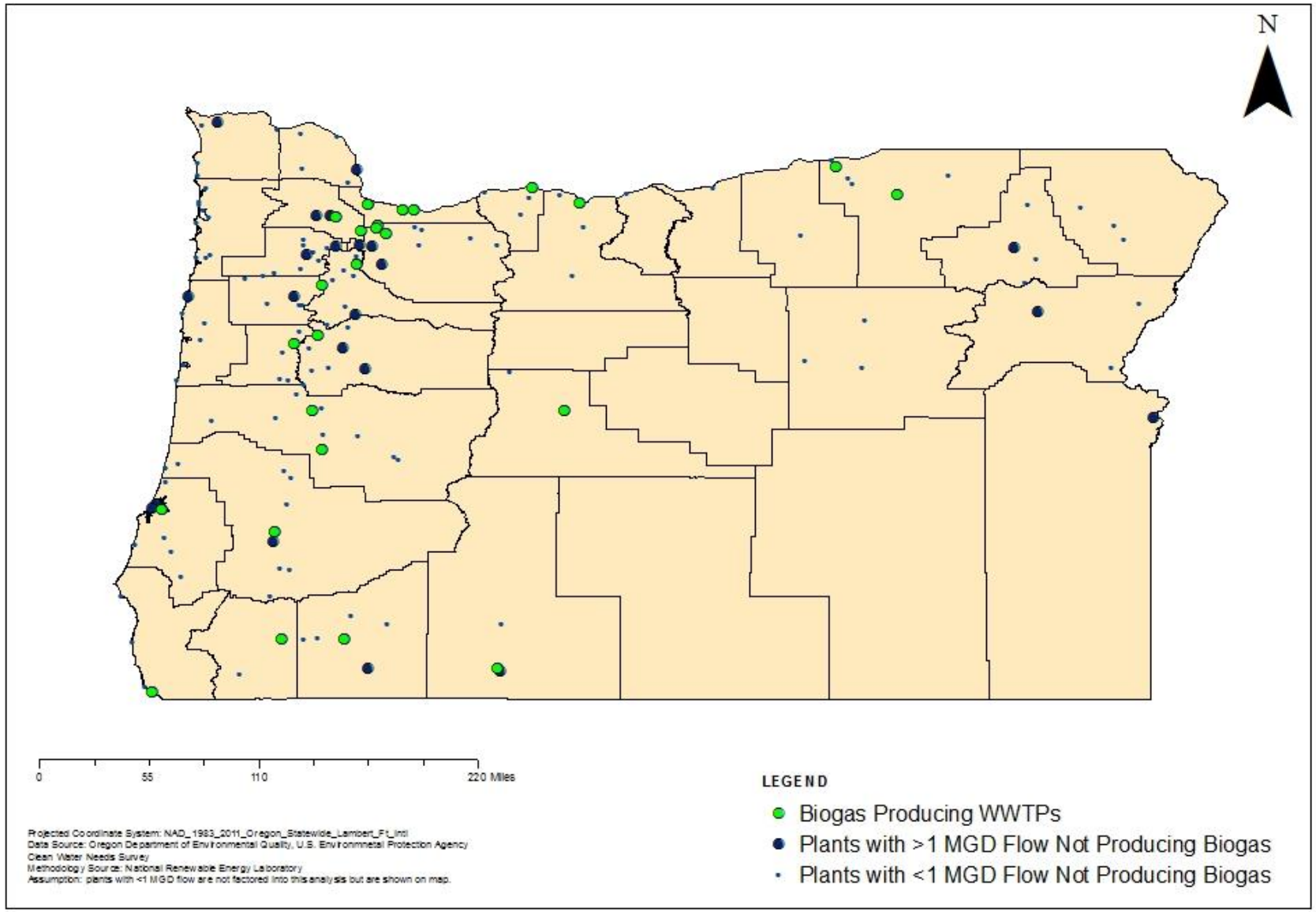
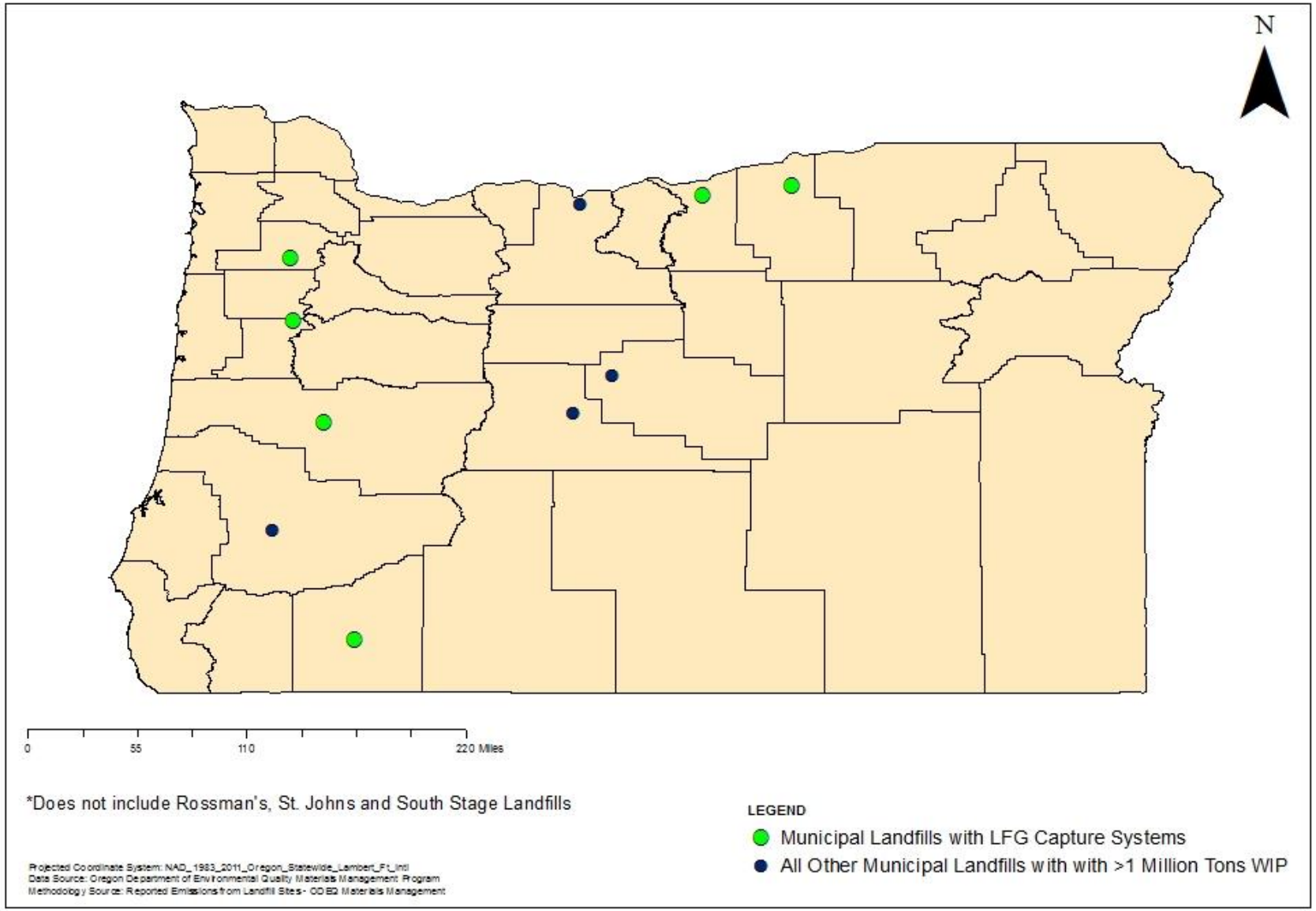
Municipal Wastewater Treatment Plants in Oregon, 2017



Active Municipal Landfills with >1 Million Tons Waste in Place Within Oregon, 2017



Group 4 – Comprehensive list of all potential biogas and RNG resources. _ ODOE report out on current progress.

Landfills - DEQ - Materials Management - modelled

Yard Debris, Composting - DEQ - Materials Management - modelled

Confined Animal Feeding Operations - ODA - CAFO and Fertilizer Program Operator Information - calculated

Wastewater Treatment Facilities - DEQ - Water Quality Permitting & Program Development - calculated

Forest Industry Residuals - ODF, U of I - Northwest Advances Renewables Alliance - modelled

Agriculture Industry Residuals - TBD

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Subcommittees

- Group 1 – Technical process review (AD, thermal gasification and gas clean up) (Tim Logan, Lee Fortier).
- Group 2 – Supply chain description by feedstock including WWTF, LF, Food waste, Ag Manure, Cellulosic biomass, and by region (Laura Leebrick).
- Group 3 – Economic overview (to follow supply chain analysis).
- Group 4 – Comprehensive list of all potential biogas and RNG resources. _ ODOE report out on current progress.
- Group 5 – GHG and Air Pollution reductions.
- Group 6 – Funding the two unfunded tasks (detailed supply chain economic assessment and LCA).

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Risk Categories

Producers

Developers

Local Distribution Companies

Fleets

Government

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Policy, Barriers, and Opportunities

Long Term Policy

Short Term Policy

Regulatory Barriers

Commercial Barriers

General Opportunities

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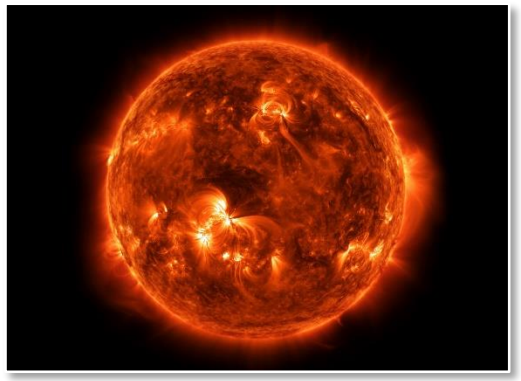
Next Steps

Questions



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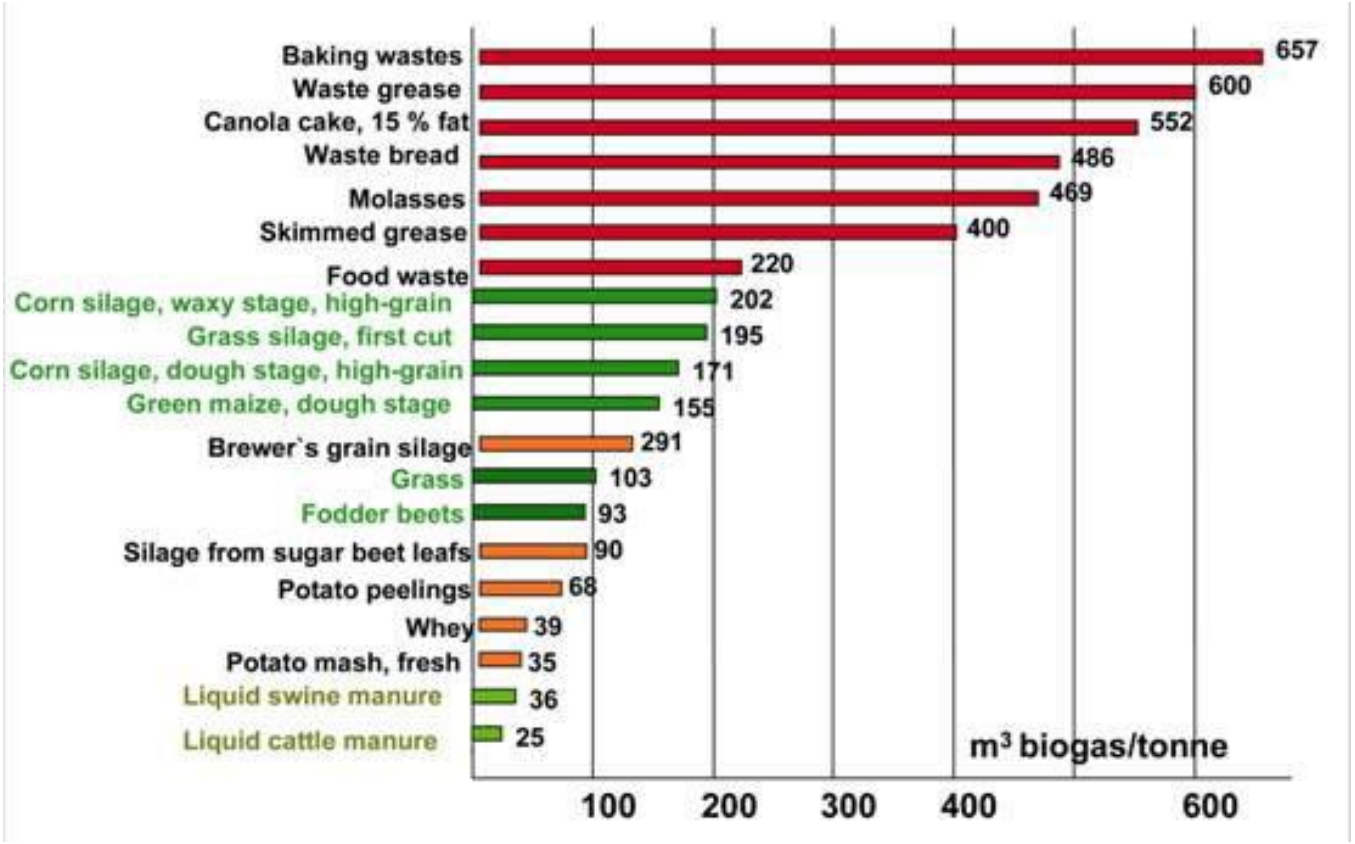
Example

Example for anaerobic digestion

What about other technology like thermal gasification or?



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