



Fungal Pre-treatment of Lignocellulosic Waste for Anaerobic Digestion and Upgrading to Renewable Natural Gas

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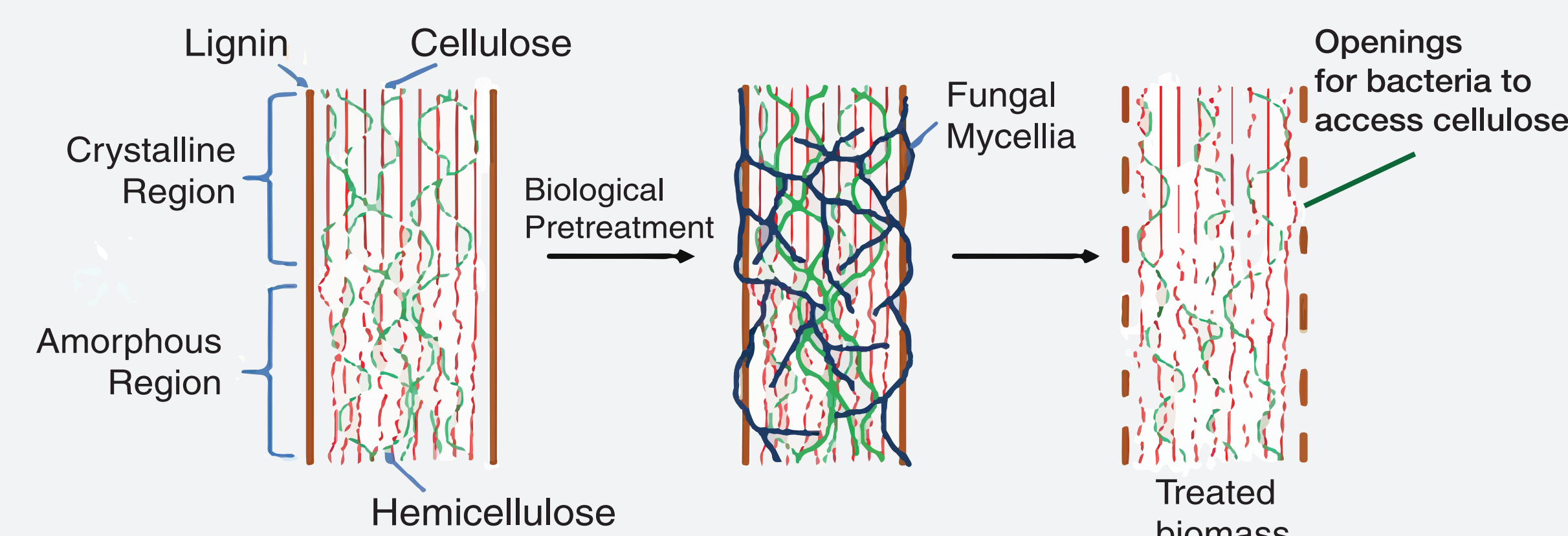


Introduction

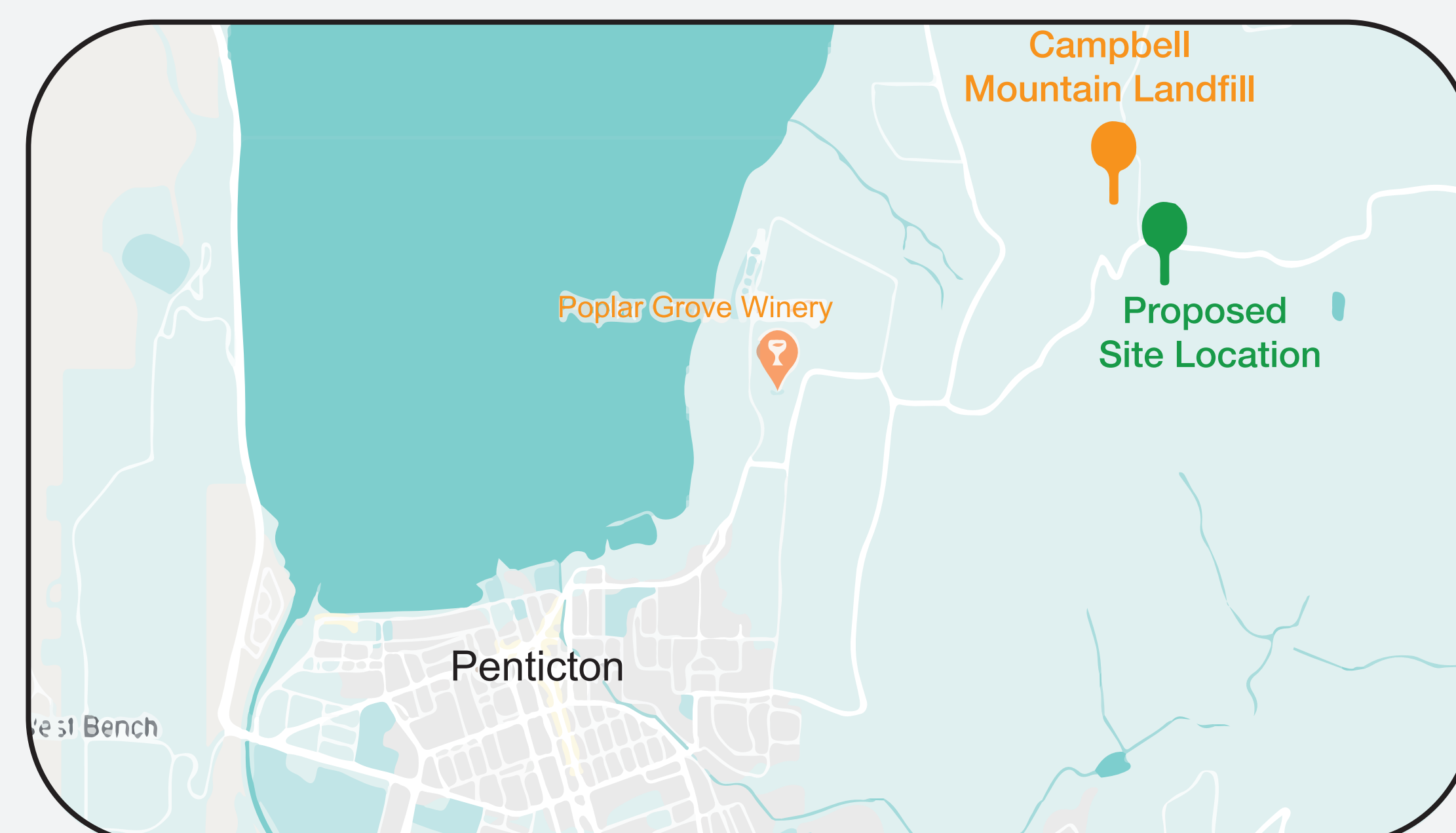
Anaerobic digestion is a widely-known clean technology that converts organic waste into renewable natural gas. Facilities in British Columbia generally must produce over 50,000 GJ of RNG per year to be economically feasible. However, tradition processes only use easily digestible organic waste such as food waste, limiting RNG projects to larger cities which produce greater volumes of waste.

Goal: To increase the production of biogas from anaerobic digestion of organic waste, making biogas facilities viable in smaller cities.

Innovation: A fungal pre-treatment step, which breaks down lignin and hemi-cellulose to turn non-digestible lignocellulosic biomass into viable feedstock.



Plant Location



Environmental



Processing

Lignocellulosic, food, and green waste is brought to the facility from surrounding municipalities. The green and food waste are input to mulcher while the lignocellulosic waste enters a shredder for processing.

Fungal Pre-treatment

Processed lignocellulosic waste is loaded into the fungal reactor for 21 days at 28 °C.

Organic Loading

Pre-treated lignocellulosic waste is combined with food waste to load into the first anaerobic digester.

Anaerobic Digester 1

The mixed waste is pumped into AD1 to be broken down via hydrolysis reaction and create biogas. Roughly 25% of the overall biogas is produced from AD1.

Anaerobic Digester 2

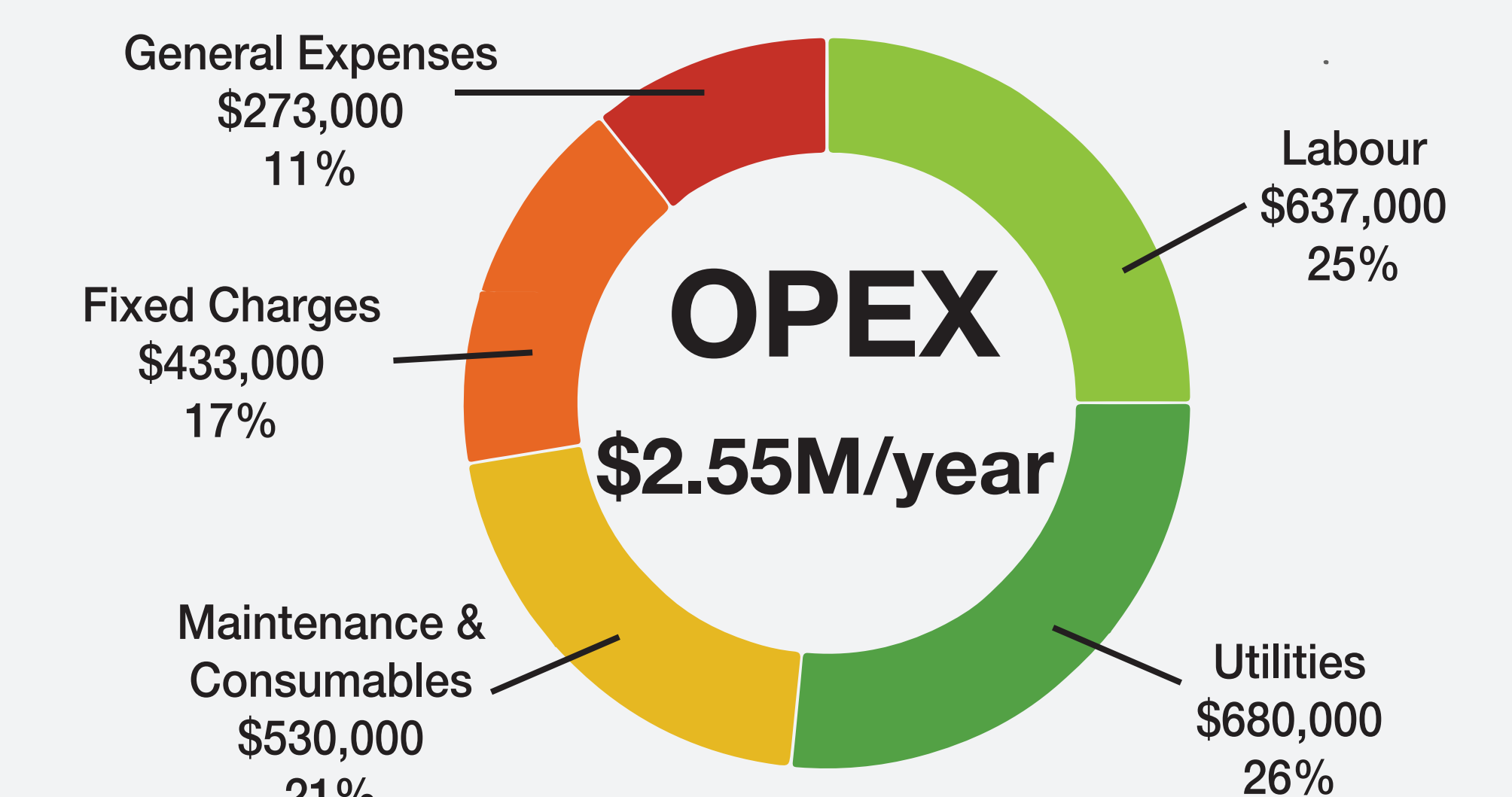
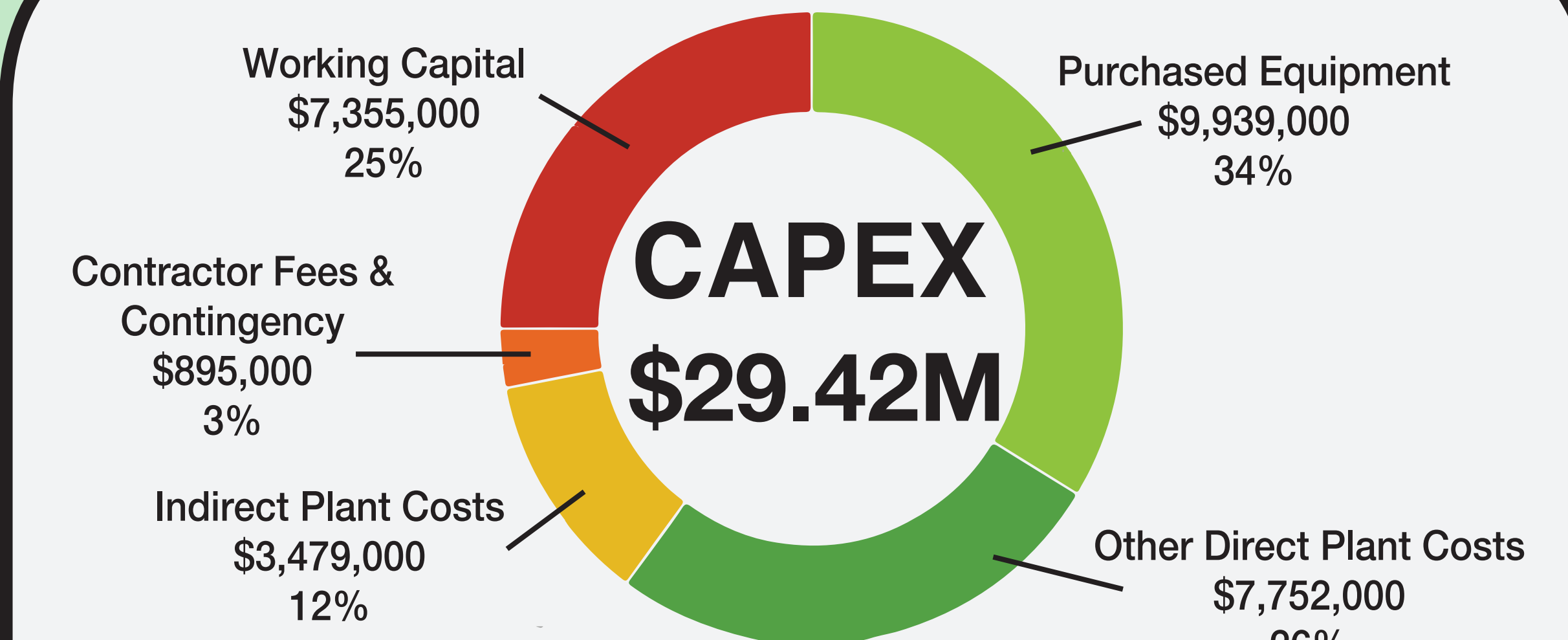
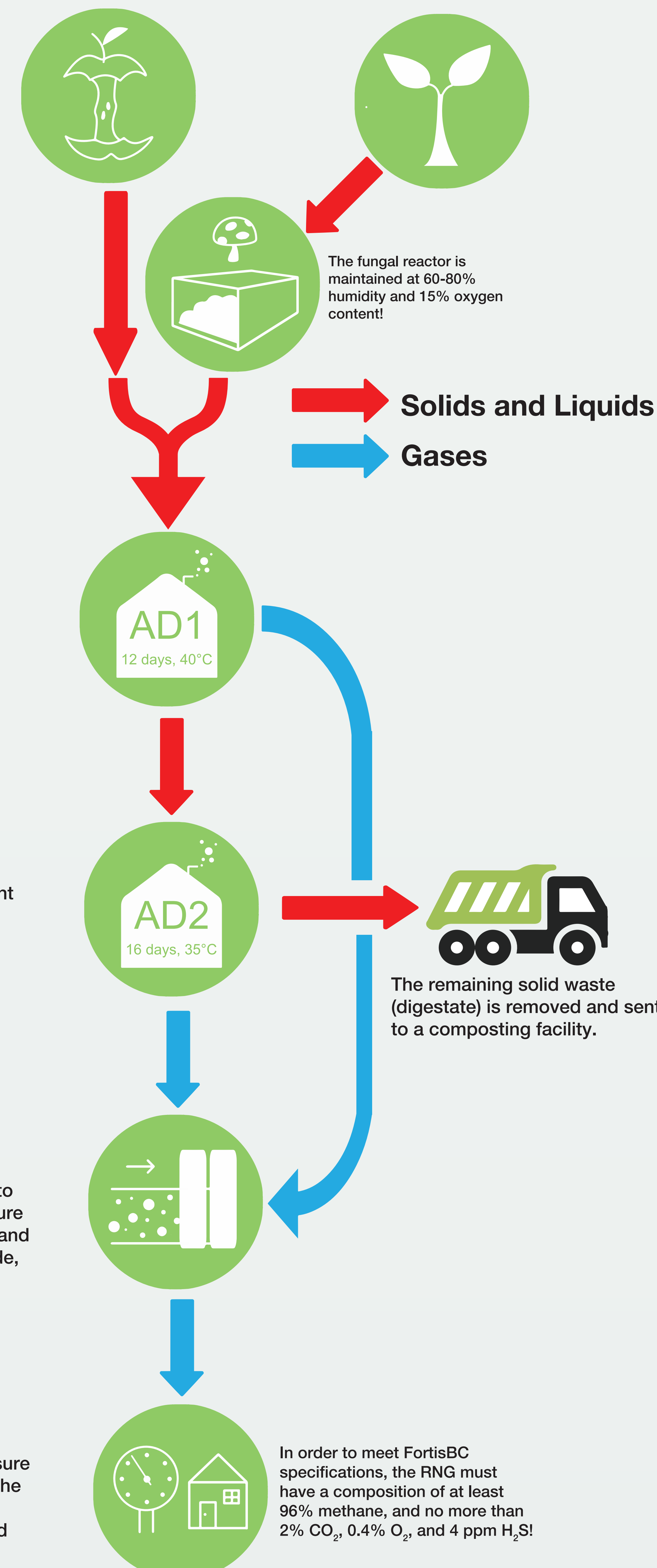
Methanogenesis reactions are predominant in AD2 to produce the other 75% of the overall biogas.

Biogas Upgrading

Biogas from AD1 and AD2 is upgraded to Renewable Natural Gas (RNG) by pressure swing adsorption. Methane is retained, and carbon dioxide, oxygen, hydrogen sulfide, and other impurities are removed.

Grid Injection

The RNG is tested by an analyzer to ensure that FortisBC specifications are met. If the specifications are passed, the RNG is injected into the natural gas pipeline and sold to customers on the grid.



7.8 % IRR



10 Year Payback Period

Assuming:

- Grants cover 50% CAPEX (\$15M)
- 5% Interest Loan
- \$1.5M Annual Gross Profit
- \$26/GJ RNG Selling Price

Grants:

Natural Resources Canada Sustainable Development Technology Canada (SDTC) for the NextGen Biofuels Fund™
British Columbia's Innovation Clean Energy Fund (ICE)
Government of Canada's Low Carbon Economy Challenge



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