NEW ZEALAND BIO-FORESTRY

BUSH TO BOTTLE

Prepared by Matt and Tane

TODAY'S PRESENTATION

OUTLINE OF TOPICS

Background
Project Scope
Integrated Site
Building The Model
Going Forward
Abacus Experience

BUSH TO BOTTLE

BACKGROUND

New Zealand's Annual Waste

2,500,000 Tonne
Forest Residue

250,000 Tonne
Plastic

WHOLE LOG APPROACH

THE SOLUTION

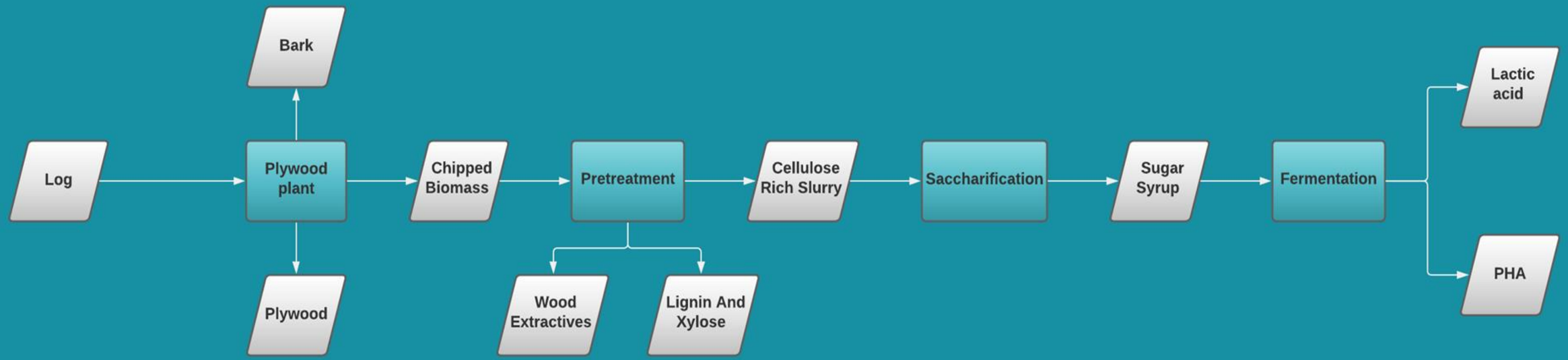
UTILISING WHOLE LOG

BIOPLASTICS

INTERGRATED ENTERPRISE

PROCESS FLOW

SIMPLE STAGE MODEL



PROJECT SCOPE

THE IMPORTANCE OF

WHO

NZ Bio-Forestry
AbacusBio
Massey University
Māori Partners
INER
Hoomankind

WHAT

Whole Log Approach
Integrated Site
Integrated Processes
Adaptable Bio-Financial Model
Research

WHY

Zero-waste
Efficiency
Bio-Plastics market
Tikanga
Kotahitanga

INTEGRATED SITE

SITE SECTIONS

SHARED OPERATIONS

Facilities that are shared by all partners in the site.

PLYWOOD PLANT

First manufacturing stage
Creates high-value plywood for export
Includes Debarking

BIOREFINERY

The process of converting woodchips to Bioplastic building blocks

INTEGRATED SITE

BENEFITS

LOGISTICS

Eliminates transport costs at each stage. Decreases delays, handling issues, storage needs

CHP PLANT

Provides an opportunity to use waste to power both plants and create process heat/steam for use in Ply and Refinery processes.

EXPANSION

This site will offer future opportunities to expand to a full scale biorefinery and expand presence in bioplastics industry

BUILDING THE MODEL

DESIGN AND INTEGRATION

BUILDING THE MODEL

- Identify key problem areas – ‘what can kill this project?’
- Make educated assumptions based on research
- Outline full flow of processes from log arriving to different end-markets
- Identify certain, semi-certain and uncertain stages/markets
- Create fully adaptable/dynamic spreadsheet to model both financial and biological aspects of the project

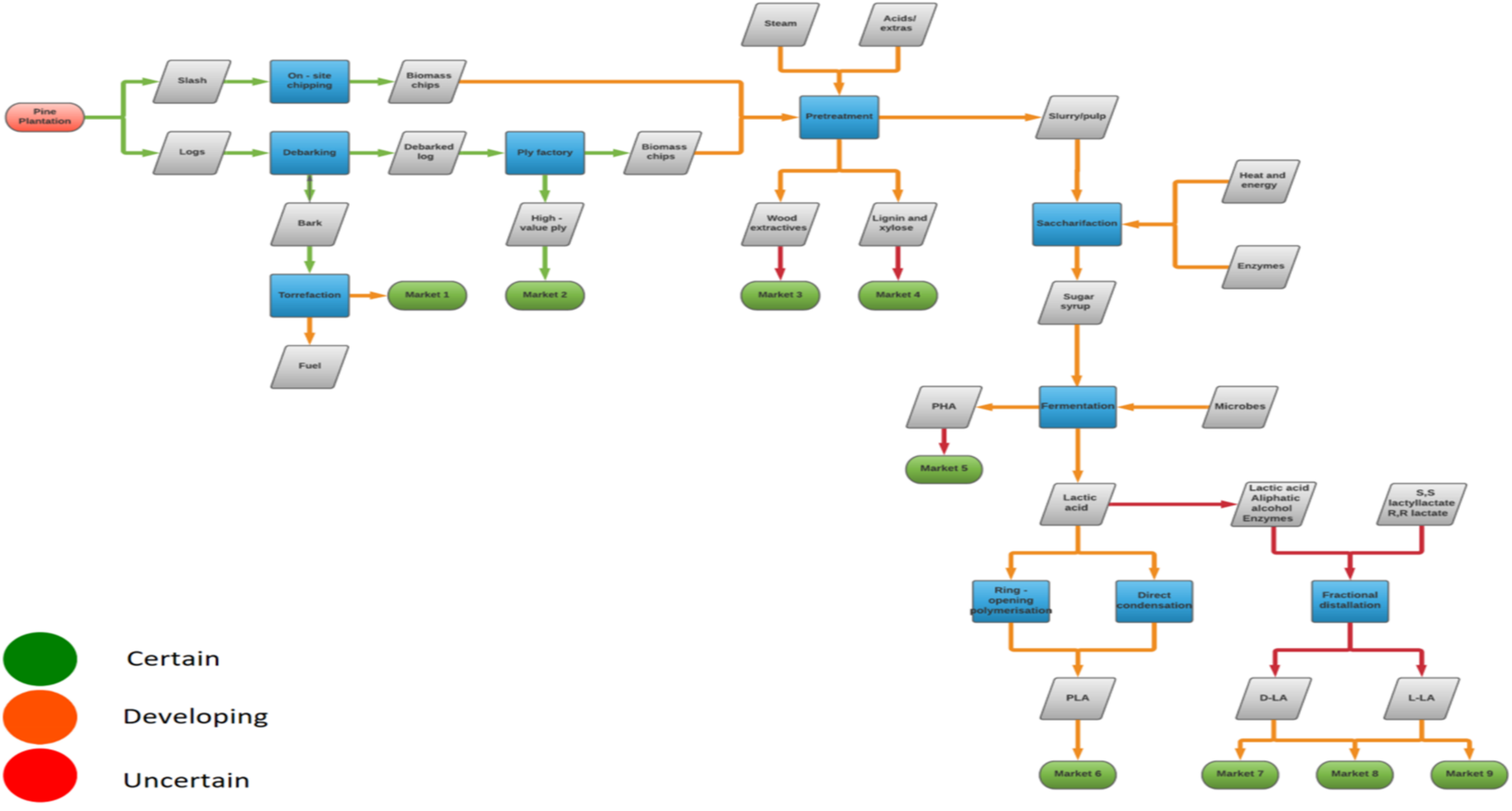
BUILDING THE MODEL

Assumptions

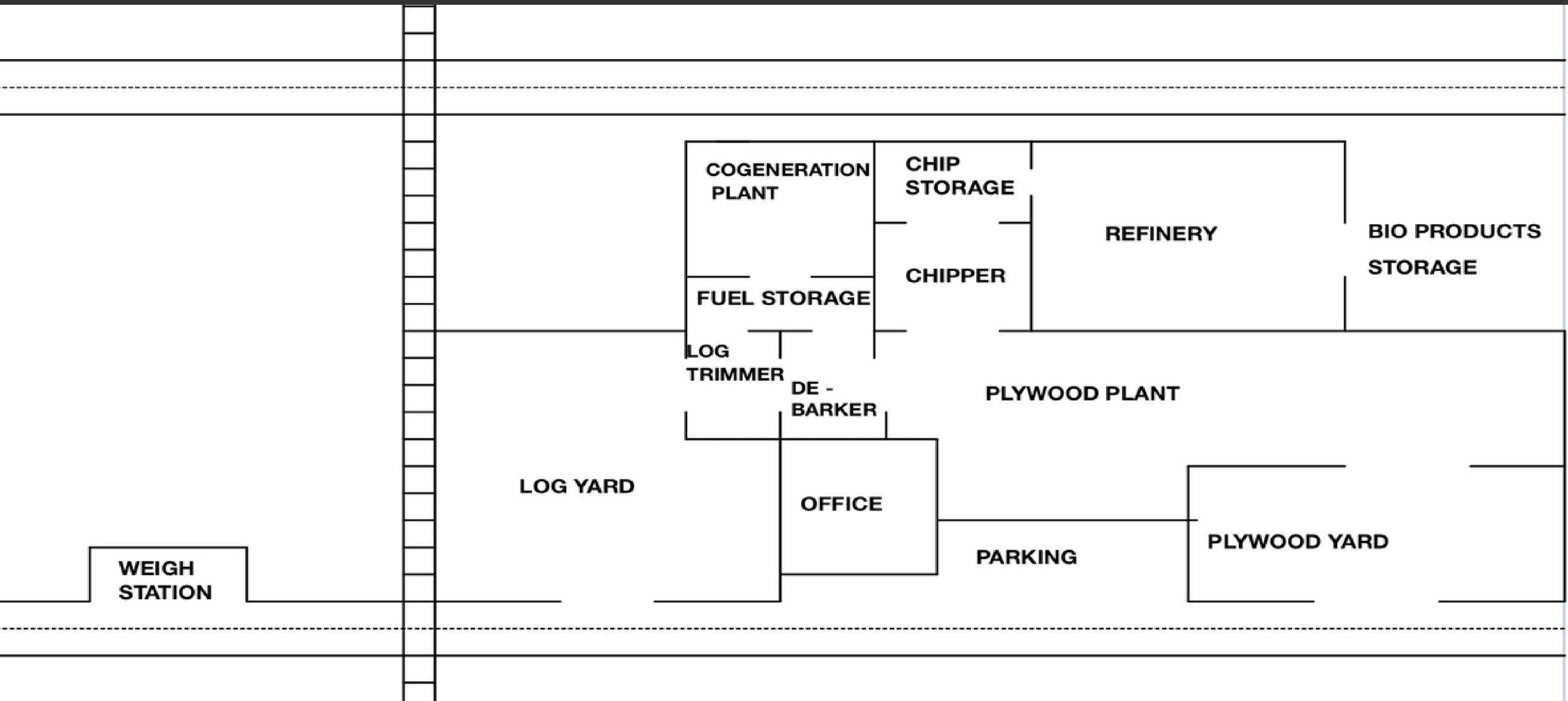
- Throughput
- Inputs (composition, Moisture Content)
- Pretreatment Method
- Power/Heat Demand
- Plywood Yields
- Lactic Acid Yields
- Enzyme/Microbe Use

Problem Areas

- Sugar Breakdown
- Log Composition
- Misinformation
- Plywood Weight
- Creating Formula
- Making Model dynamic/adaptable
- Handling/Storage Issues
- Power/Heat
- Microbes/Enzymes


Pine Plantation
Slash
Logs
On - site chipping
Debarking
Biomass chips
Debarked log
Ply factory
Biomass chips
Bark
Torrefaction
Market 1
Fuel
High - value ply
Market 2
Steam
Acids/ extras
Pretreatment
Wood extractives
Lignin and xylose
Market 3
Market 4
Slurry/pulp
Saccharifaction
Heat and energy
Enzymes
Sugar syrup
PHA
Fermentation
Microbes
Market 5
Lactic acid
Lactic acid Aliphatic alcohol Enzymes
S,S lactyllactate R,R lactate
Ring - opening polymerisation
Direct condensation
Fractional distallation
PLA
D-LA
L-LA
Market 6
Market 7
Market 8
Market 9
Certain
Developing
Uncertain

Concept Layout



WHAT WE HAVE ACCOMPLISHED

Research

Dynamic Model

Reports

GOING FORWARD

MICROBES

Continue to work with the University of Otago to develop microbes for fermentation. Use new reliable yields in the model, scaling up.

ADDING EXPERTISE

Look to bring in people more suitable to the individual aspects. (Engineers, Ply Manufacturers etc)

COMPLETION/IMPLEMENTATION

Use continuing research and ideas to update and improve the model