





# Gasification of Polyethylene for Hydrogen Production

Group P5: Alyssa Liu, Andy Lo, Brian Tang, Cecilia Muys, Michael Kyoung, Nick Hackwell, Viola Owiti

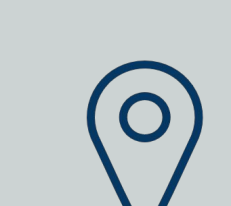
## PROJECT BACKGROUND

**OBJECTIVES:**


- Produce pipeline quality hydrogen from polyethylene
- Integrate plant with FortisBC's existing infrastructure

**CAPACITY:**

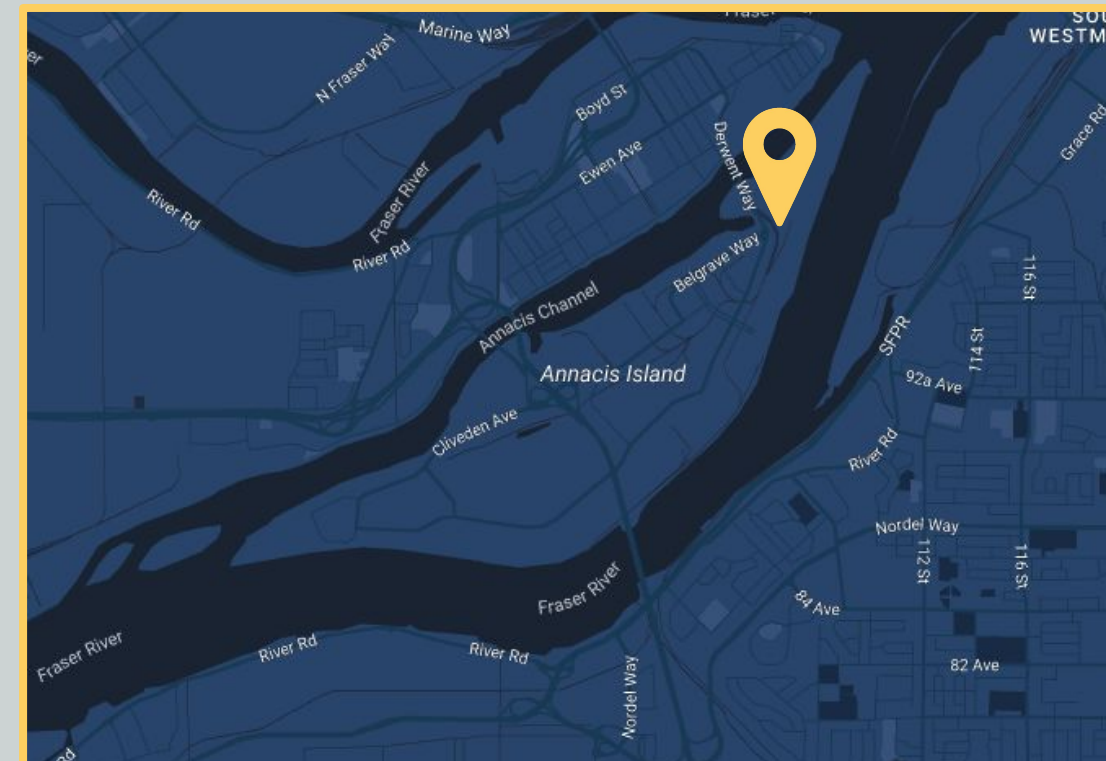
- 300,000 GJ/year of hydrogen
  - 98% purity

**LOCATION:**

- Annacis Island, Richmond, BC

**PLANT LIFE:**

- 15 years




## ECONOMICS

**TOTAL CAPITAL INVESTMENT: \$90 MM USD**

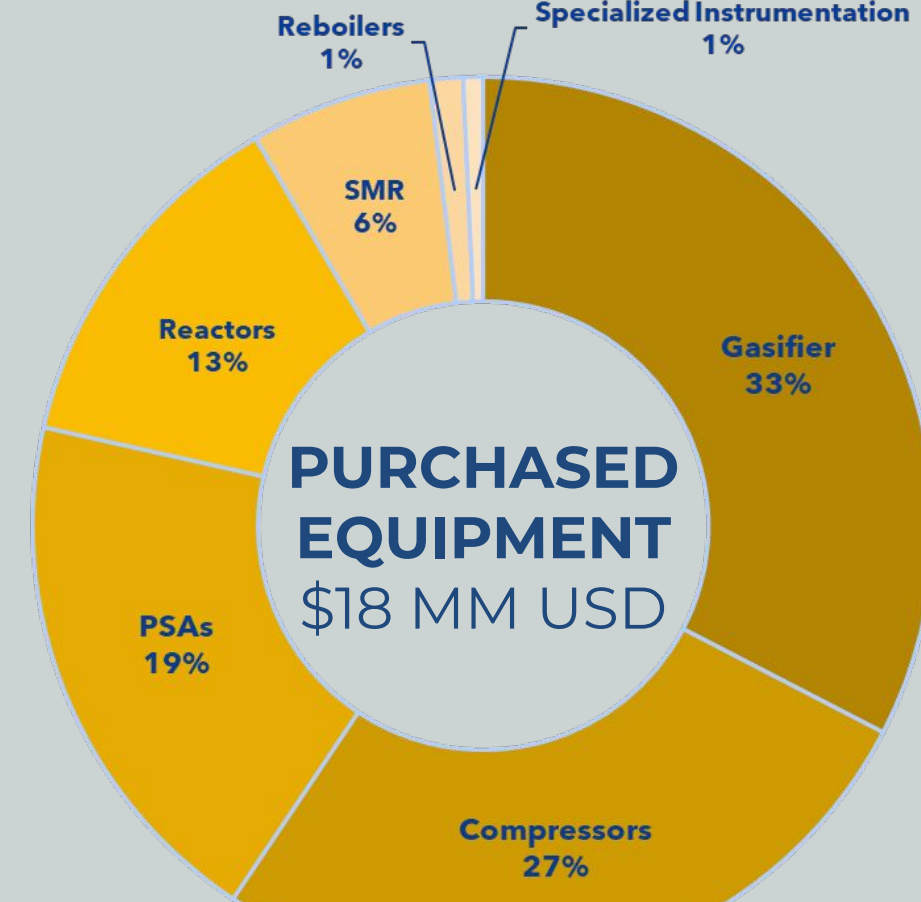
- 85% fixed capital investment
- 15% working capital

**ANNUAL OPERATING COST: \$25.3 MM USD**

- 54% raw materials
- 8% labour costs
- 7% utilities

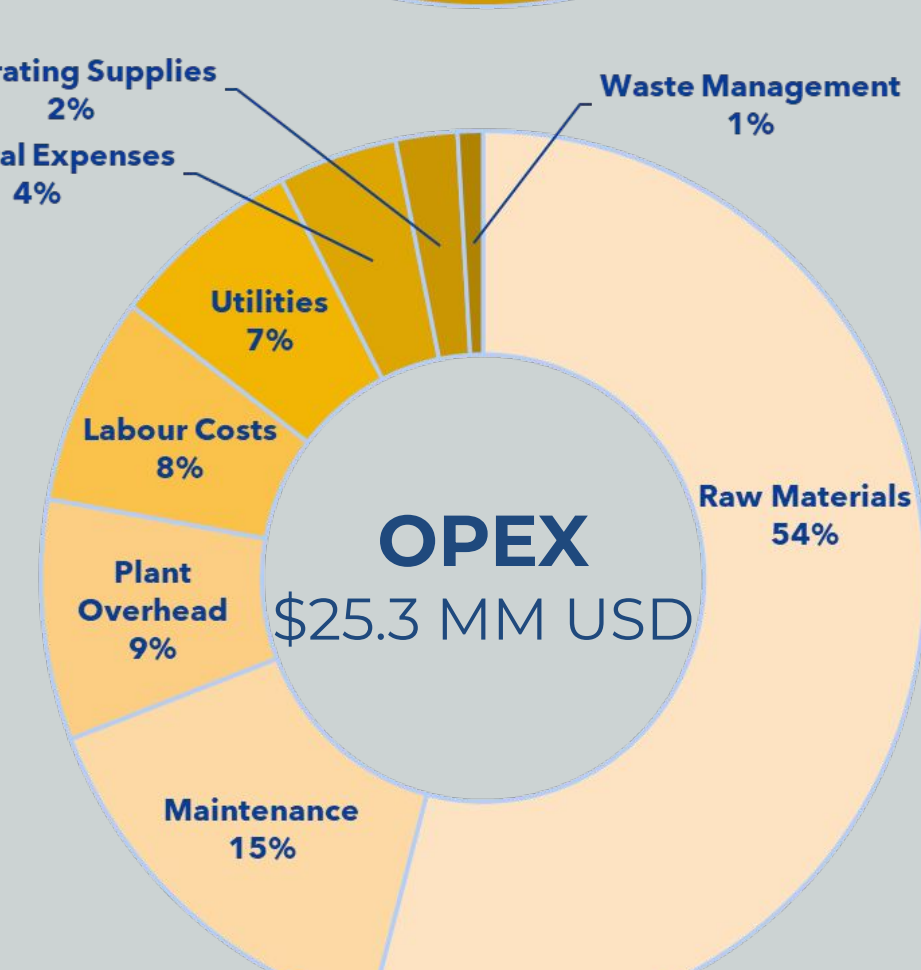
**ANNUAL REVENUE: \$9.6 MM USD**

- 73% hydrogen sales @ \$23.50 USD/GJ
- 27% carbon credit sales @ \$220 USD/tCO<sub>2</sub>e



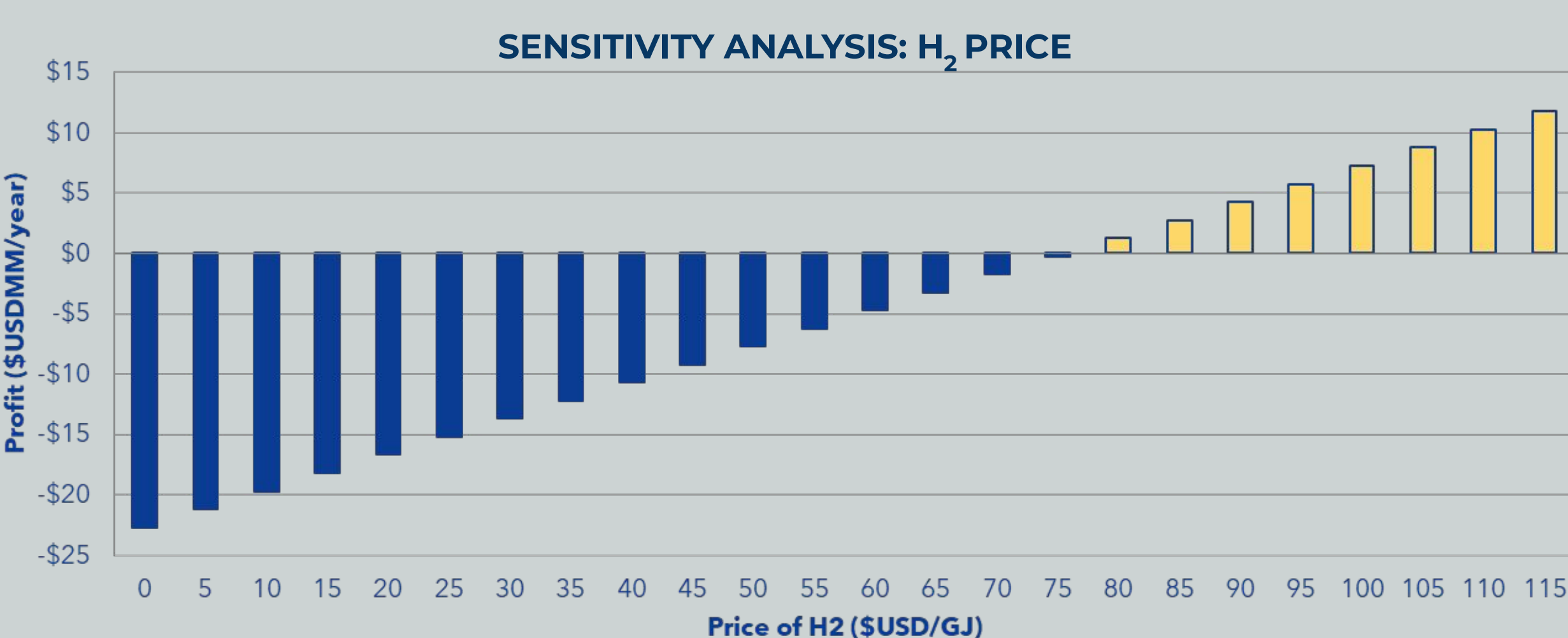
**PURCHASED EQUIPMENT \$18 MM USD**

Equipment	Percentage
Gasifier	33%
Compressors	27%
PSAs	19%
Reboilers	1%
Specialized Instrumentation	1%
SMR	6%
Reactors	13%



**OPEX \$25.3 MM USD**

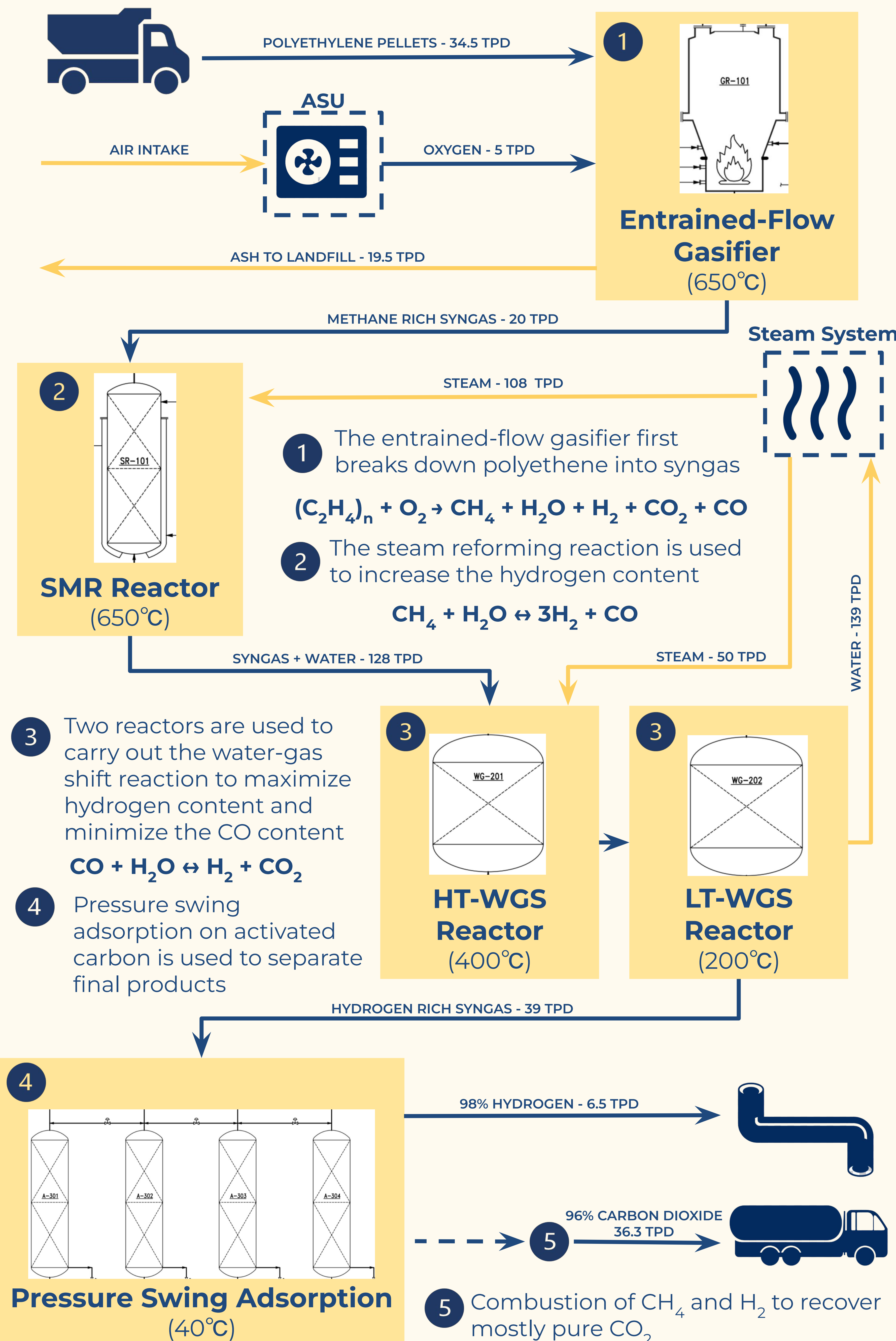
Category	Percentage
Raw Materials	54%
Maintenance	15%
Plant Overhead	9%
Labour Costs	8%
Utilities	7%
General Expenses	4%
Operating Supplies	2%
Waste Management	1%




**RECOMMENDATION & COMPARISON:**

- To be **economically viable**, the price of H<sub>2</sub> must increase
- ~ **9x** more expensive than **SMR with Carbon Capture**


## PROCESS OVERVIEW



## ENVIRONMENT

**SOLID WASTE:**

- 19.5 tonnes per day of ash sent to landfill
- Ash concentration assessed according to Canadian Environmental Assessment Act

**DIRECT CO<sub>2</sub> EMISSIONS:**

PROCESS EMISSIONS: 11,964 tCO<sub>2</sub>e/year

- Sequestered by FortisBC

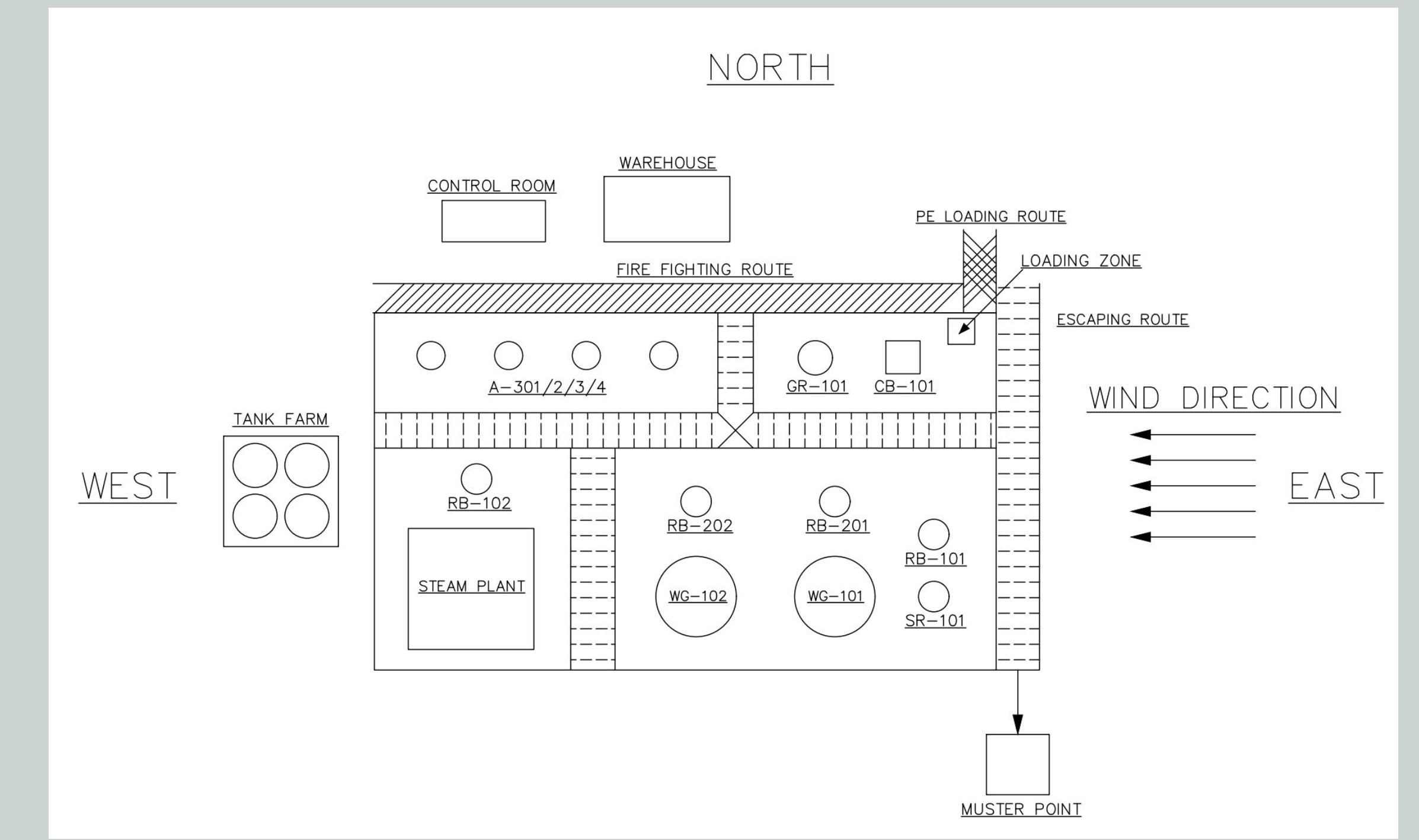
STEAM GENERATION: 10,897 tCO<sub>2</sub>e/year

- Requires an Air Discharge Permit from Metro Vancouver
- Must report emissions under the Greenhouse Gas Industrial Reporting and Control Act
- Could be reduced through point source capture or electric boilers

**FUEL CO<sub>2</sub> INTENSITY:** 40.4 kg CO<sub>2</sub>e/GJ

More CO<sub>2</sub> intensive than blue hydrogen today

## PLANT LAYOUT



## INDUSTRY SPONSOR



## ACKNOWLEDGEMENTS

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