

H₂ Production with Steam Methane Reformation using Oxyfuel Combustion with Carbon Capture

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Introduction

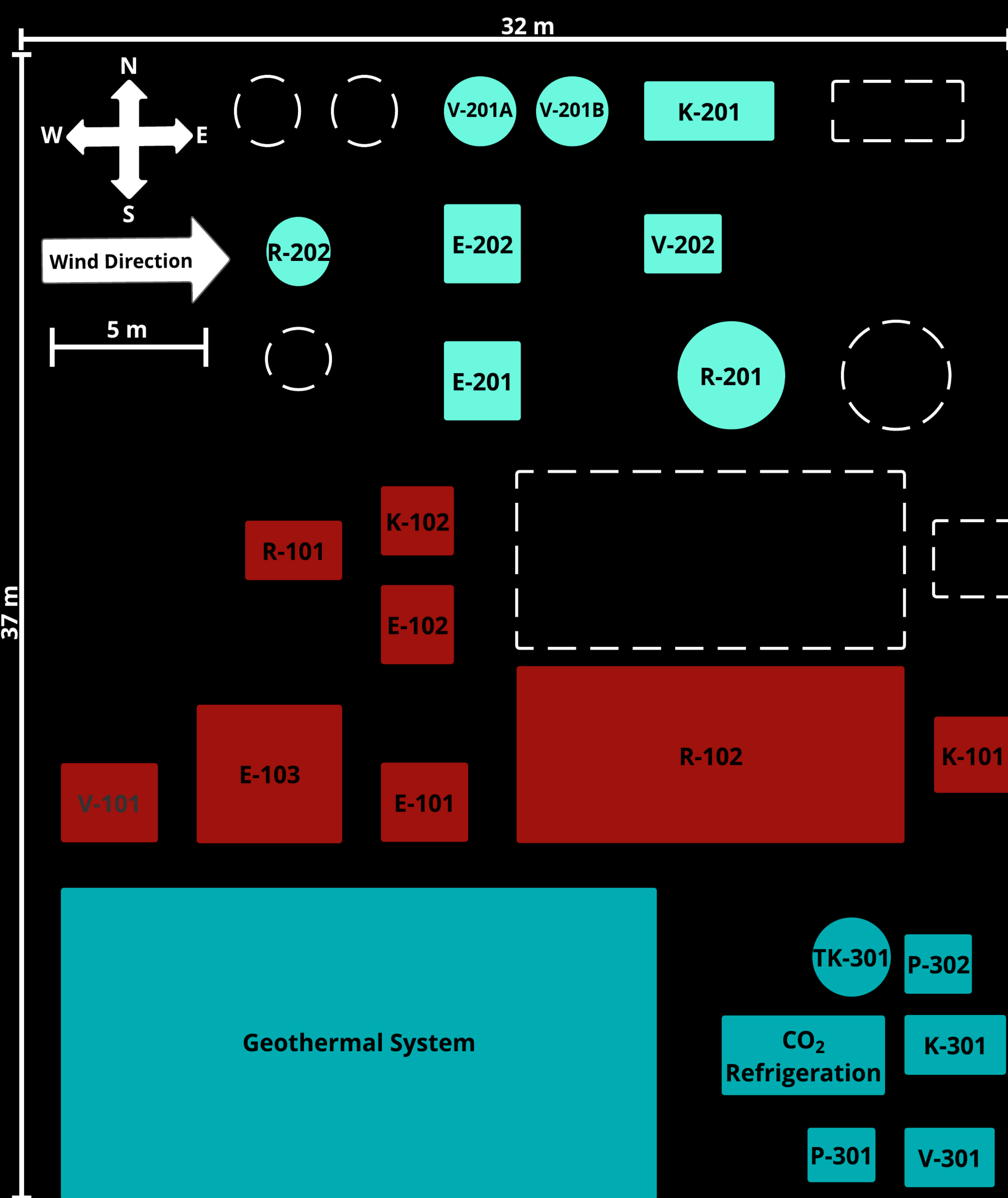
Meager Creek, British Columbia

- 5 tonnes H₂ per day Produced
- 2.4 tonnes CO₂ per day Captured
- Oxyfuel Combustion

Market Demand

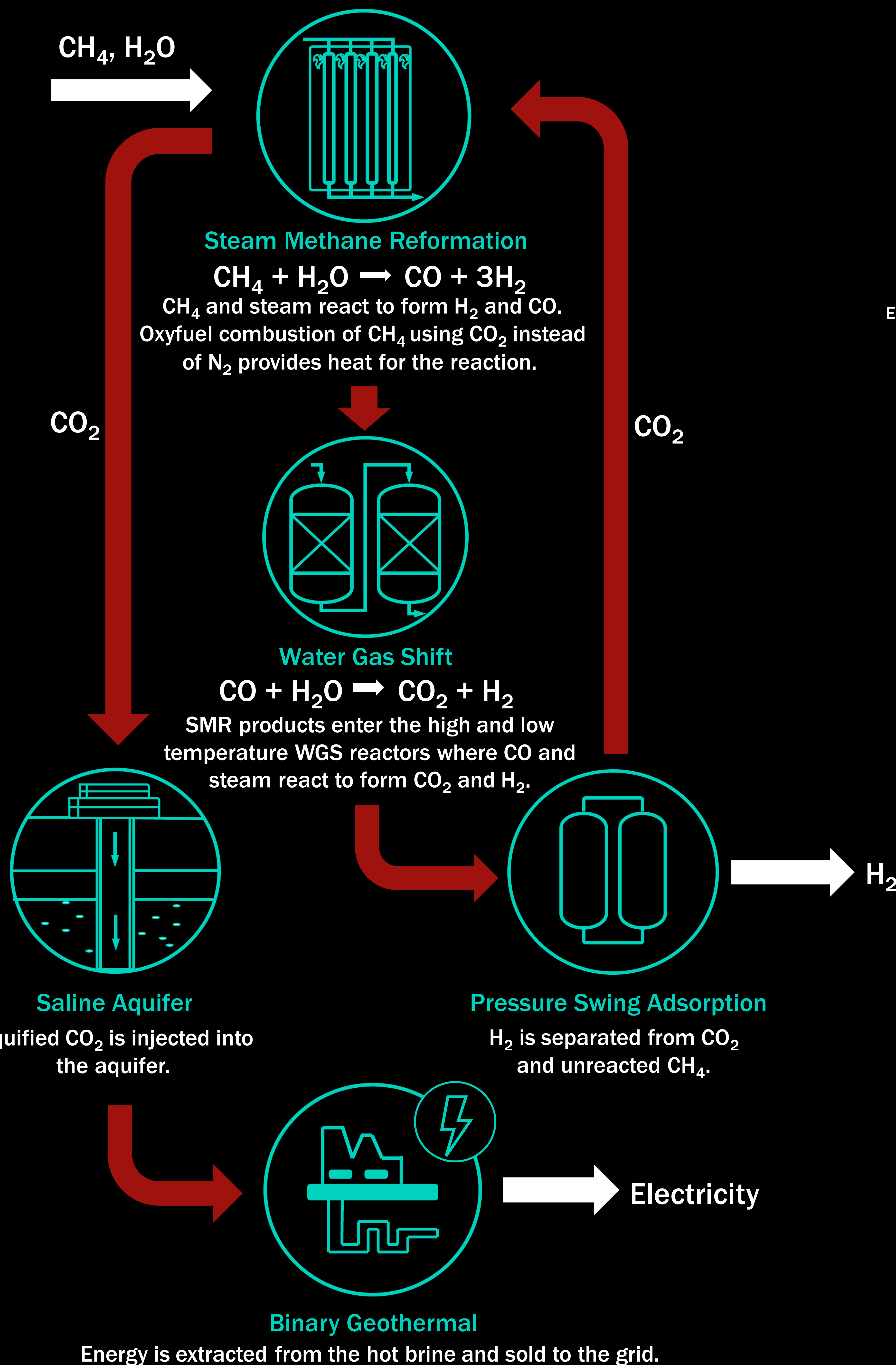
- Local Demand: 1.2 MM tonnes H₂ by 2050
- Global Demand: 100 MM tonnes H₂ by 2050
- Plant will support 10,000 FCEVs

Plant Layout

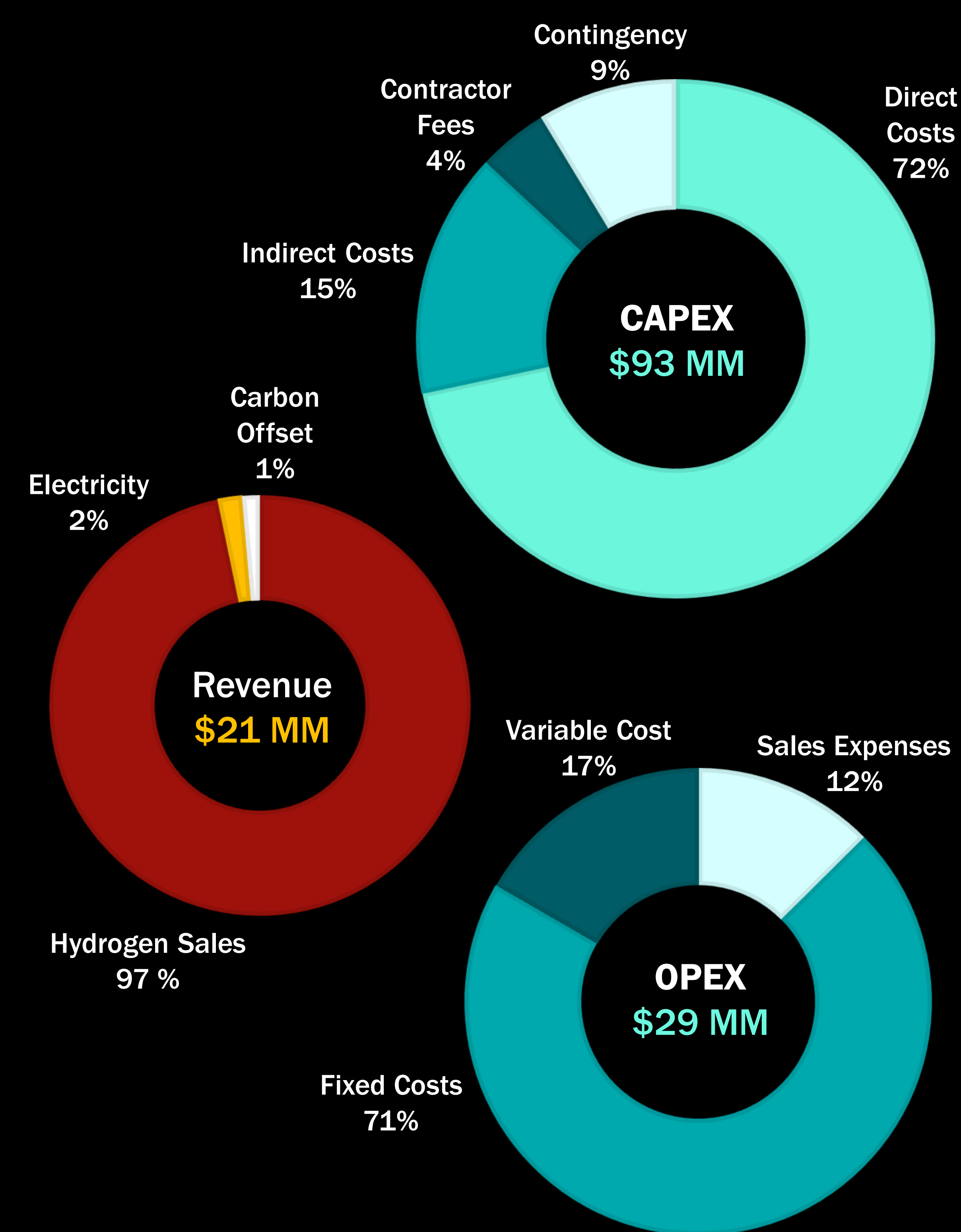


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|----------------------------------|---------------------------------------|---|
| V-201: Pressure Swing Adsorption | R-101: Start-up Boiler | K-301: CO ₂ Multi-stage Compressor |
| V-202: Flash Drum | R-102: Steam Methane Reformer | P-301: CO ₂ Pump |
| K-201: Multistage Compressor | K-101: Natural Gas Compressor | P-302: Water Pump |
| R-201: High T Shift Reactor | K-102: CO ₂ Recycle Blower | TK-301: Water Storage Tank |
| R-202: Low T Shift Reactor | E-101: SMR Waste Heat Boiler | V-301: CO ₂ V&L Separator |
| E-201: Heat Exchanger for HTS | E-102: SMR Product Cooler | |
| E-202: Heat Exchanger for LTS | E-103: SMR Flue Gas Cooler | |
| | V-101: Knockout Drum | |

Process Description



Economics



Economics: Scale-up

- 10 tonnes H₂ per day Produced
- 15% MARR
- \$39 MM Loan
- Year 0-10: \$11-12 MM Actual ATCF
- Year 11-20: \$13-16 MM Actual ATCF
- H₂ selling price: \$15.4 per kg

Environmental

- 16 km from Upper Lillooet Provincial Park
- 450,000 m³ per year water
- Water from SMR
- H₂S from NG scrubber

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