

ALUMINIUM RESIDUES & WASTE BIOMASS TO PRODUCE GREEN FUEL



ALU GREEN

LET'S CHANGE THE WORLD WITH
GREEN APPROACHES!

TEAM **PRR** OF THE INTERNATIONAL SUMMER SCHOOL ON
RENEWABLE ENERGY OF RLS-ENERGY NETWORK

ALUMINIUM PRODUCTION IMPORTANT ECONOMY

P

R

R

Process **Progress**

- Canada: 4th largest Al producer (90 % - Quebec)
- Direct jobs: 10,000 / jobs related: 20,000
- Energy consumption/ton aluminium:
 - 16 MWh electricity
 - 10 MWh thermal
- Quebec: very clean energy

ENVIRONMENTAL ISSUES WITH ALUMINUM

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- Poisonous and large Green House Gases
0.7 ton CO and CO₂ per ton Al from electrode burning

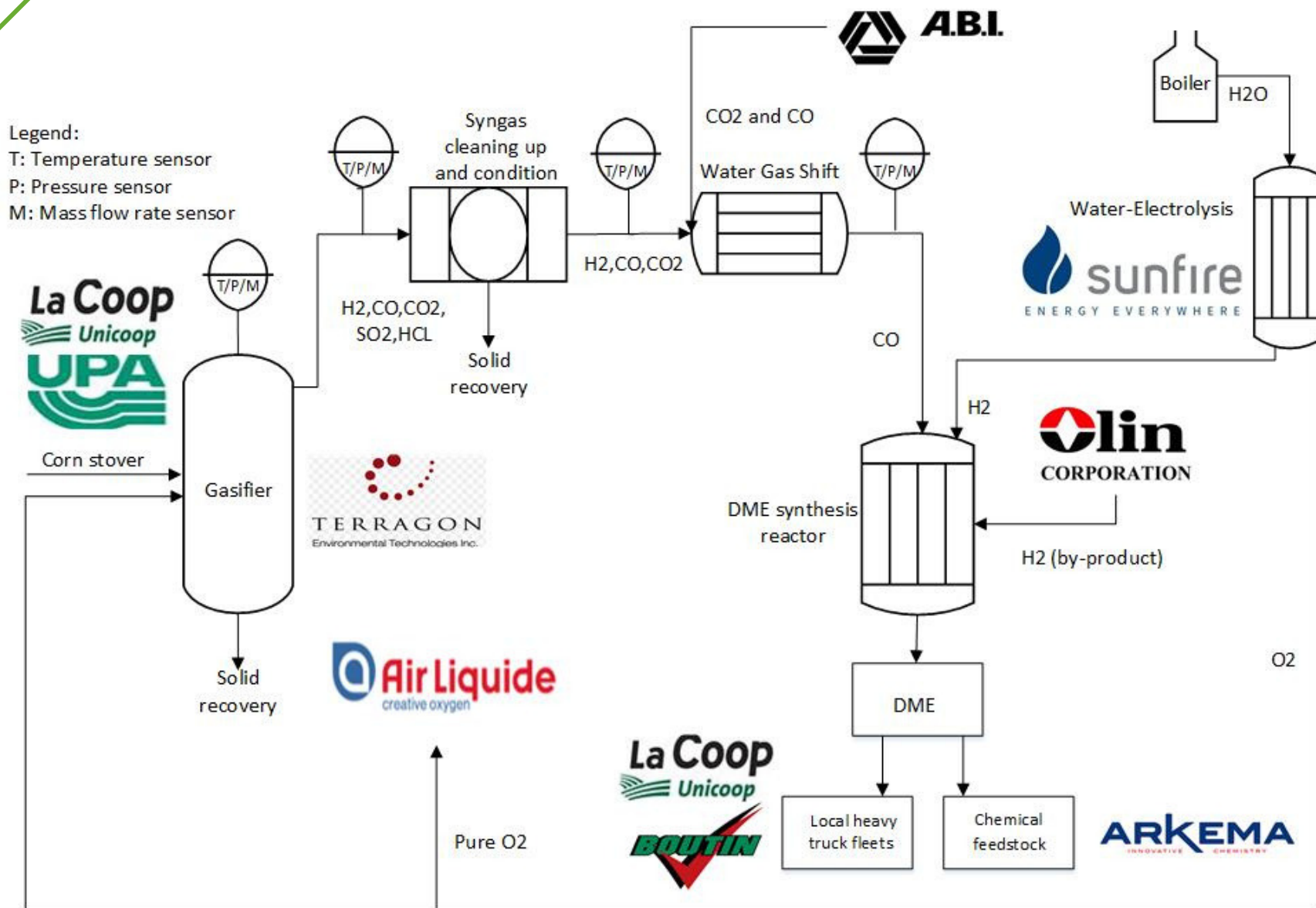
Solution:

Utilization of CO and CO₂



PROCESS OVERVIEW

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Process Progress



TECHNICAL DATA FOR BÉCANCOUR (PQ, CANADA)

CO Emissions from Becancour aluminium plant	52,000	tons/year
CO2 Emissions from Becancour aluminium plant	237,100	tons/year
Biomass from surrounding farmers (dry)	70,000	tons/year
SOEC Electrolyzer Power	190	MW
Increase in electricity consumption of aluminium plant	22	%
Dimethyl Ether (DME) Production	204,000	tons/year



ECONOMIC ANALYSIS

	DME at 0.9 \$/kg	DME at 1.28 \$/kg	DME at 0.9 \$/kg and 1/3 of the electrolyser cost
CAPEX (\$ millions)	494.28	494.28	274.28
OPEX (\$ millions)	153.03	153.03	117.09
Profitability mesuarements			
ROI (% per year)	-0.05	10.02	11.59
Payback period (years)	20.68	6.49	5.70
Net return (\$ millions)	-49.67	0.09	4.36

CONCLUSION

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- Utilization of 318,814 tons of CO₂ per year
- Fuel for local trucks to drive 430 million km
- Future technology to combat climate change and connect farmers to industry
- Applicability for other industries and RLS regions
- DME fuel as bridging technology



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Process **Progress**

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