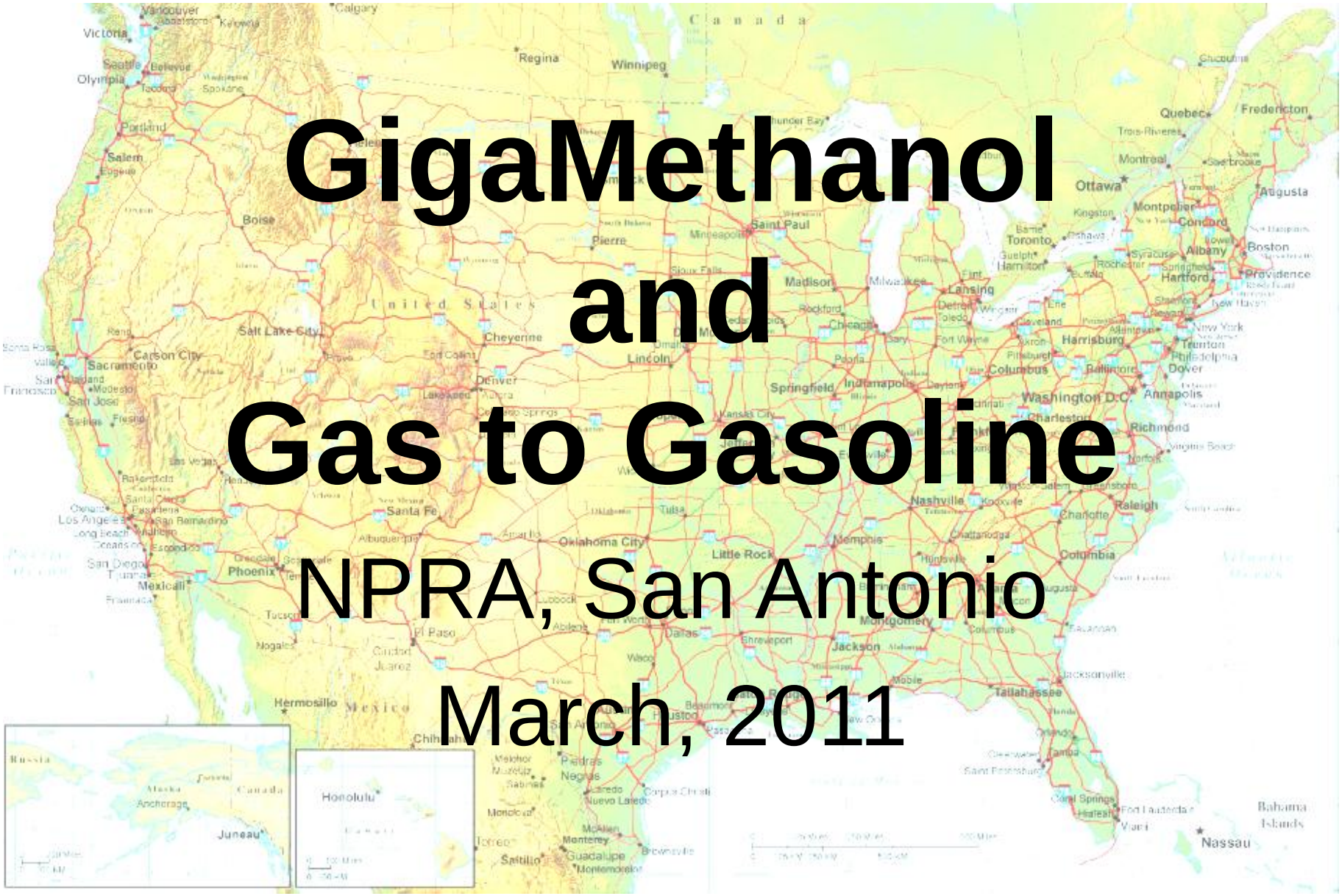
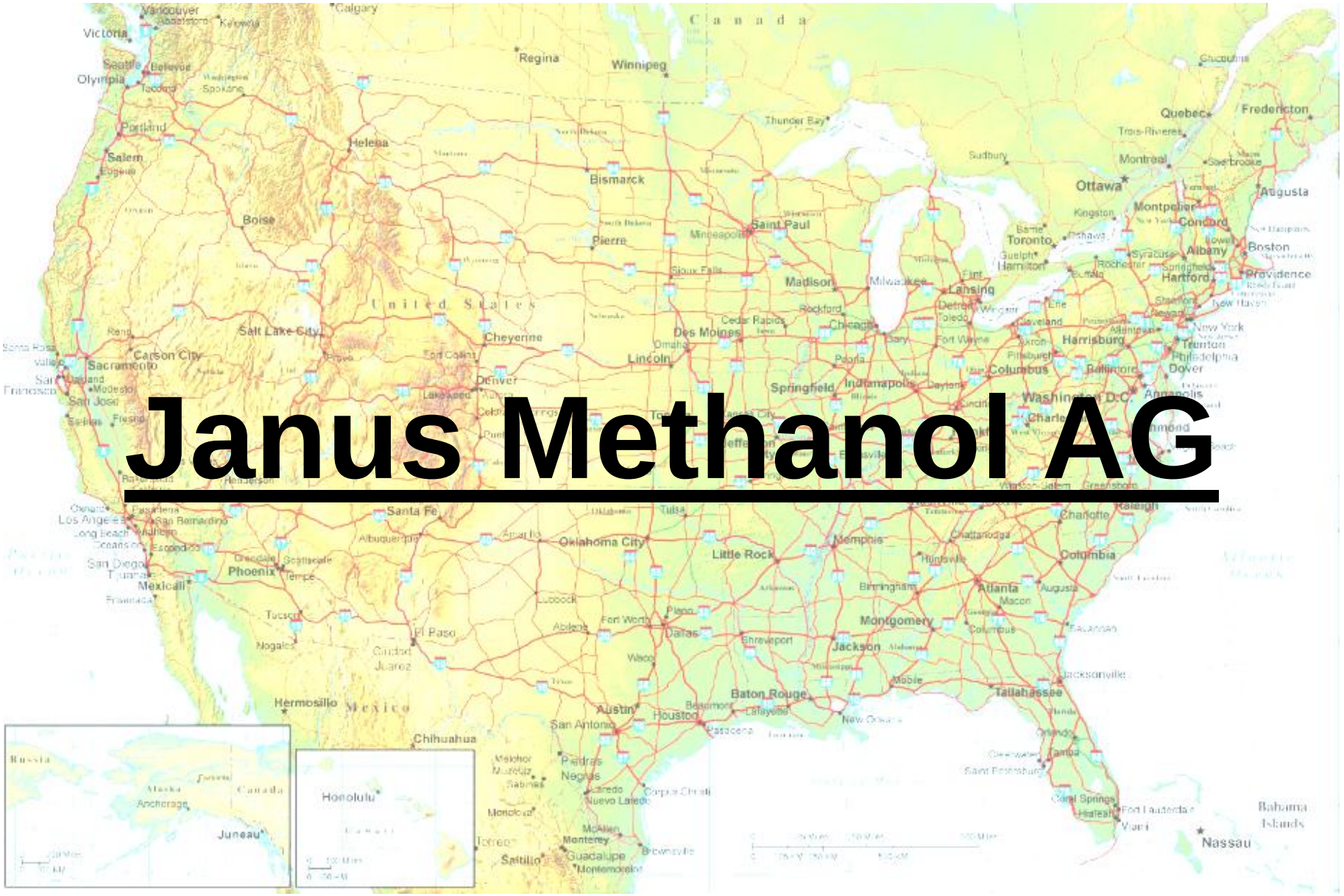


GigaMethanol and Gas to Gasoline

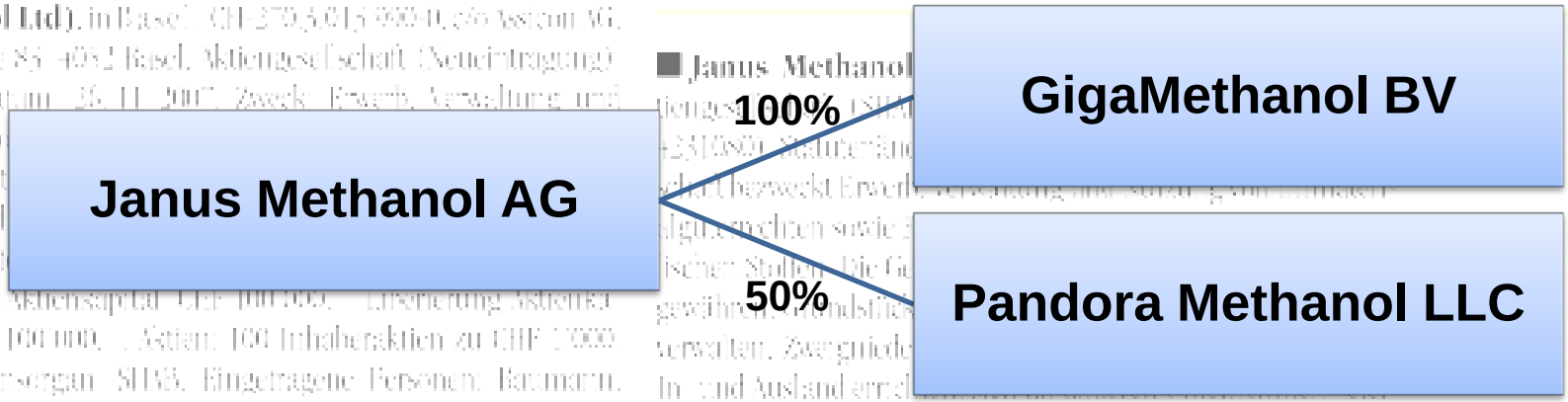
NPRA, San Antonio

March, 2011


Janus Methanol AG
Canada
United States
Mexico
Regina
Winnipeg
Thunder Bay
Sudbury
Ottawa
Montreal
Quebec
Fredericton
Augusta
Boston
Providence
Hartford
Albany
Concord
Toronto
Vancouver
Victoria
Seattle
Portland
Salem
Boise
Helena
Bismarck
Pierre
Saint Paul
Minneapolis
Madison
Milwaukee
Chicago
Detroit
Cleveland
Buffalo
Rochester
Syracuse
Harrisburg
Philadelphia
New York
Columbus
Indianapolis
Springfield
Des Moines
Omaha
Lincoln
Cheyenne
Denver
Salt Lake City
Carson City
Sacramento
San Francisco
San Jose
Las Vegas
Phoenix
Albuquerque
Santa Fe
Oklahoma City
Tulsa
Little Rock
Memphis
Atlanta
Birmingham
Montgomery
Jackson
Dallas
Houston
Austin
San Antonio
El Paso
Juarez
Hermosillo
Chihuahua
Mexicali
Tucson
Baton Rouge
New Orleans
Tallahassee
Jacksonville
Charlotte
Raleigh
Columbia
Washington D.C.
Annapolis
Dover
Baltimore
Nassau
Bahama Islands
Anchorage
Juneau
Alaska
Honolulu
Hawaii

Janus Methanol AG

- Registered In Switzerland – a methanol and chemical development and operating Company



- Janus team consists of very experienced methanol players that have developed, financed, built, operated and marketed numerous plants
- Chairman – Mr. Deo van Wijk

Janus Methanol AG

- Mr. van Wijk formed Saturn in 1994 – built Titan and Atlas in Trinidad together with BP utilising Lurgi Technology
- Janus formed in 2007 – comprising approximately 30 people
- Top 10 people have 30+ years' experience each
- Worldwide experience comes from BP, Lurgi, Ferrostaal and MG
- Strong history of large scale projects in conjunction with Lurgi

Our Experience in Trinidad &Tobago


GigaMethanol
Technology

Definitions

MegaMethanol® Technology

- 5 000 ton methanol per day in a single train
- ATLAS, the 1st MegaMethanol® project, developed and implemented in conjunction with Mr. van Wijk, Dr. Balthasar and Dr. Wagner
- Successfully operated in Trinidad (ATLAS), Iran (Zagros I & II) and Malaysia (Petronas)
- Presently four plants are in operation and two plants in construction/ erection (two trains in China after coal gasification)

Definitions

GigaMethanol Technology

- 10 000 ton methanol per day in a single train configuration based on ATLAS
- Utilising Lurgi's sophisticated high-pressure ATR-technology and two stage methanol synthesis
- Economy of scale promises a significant reduction in specific investment cost compared to MegaMethanol technology

Definitions

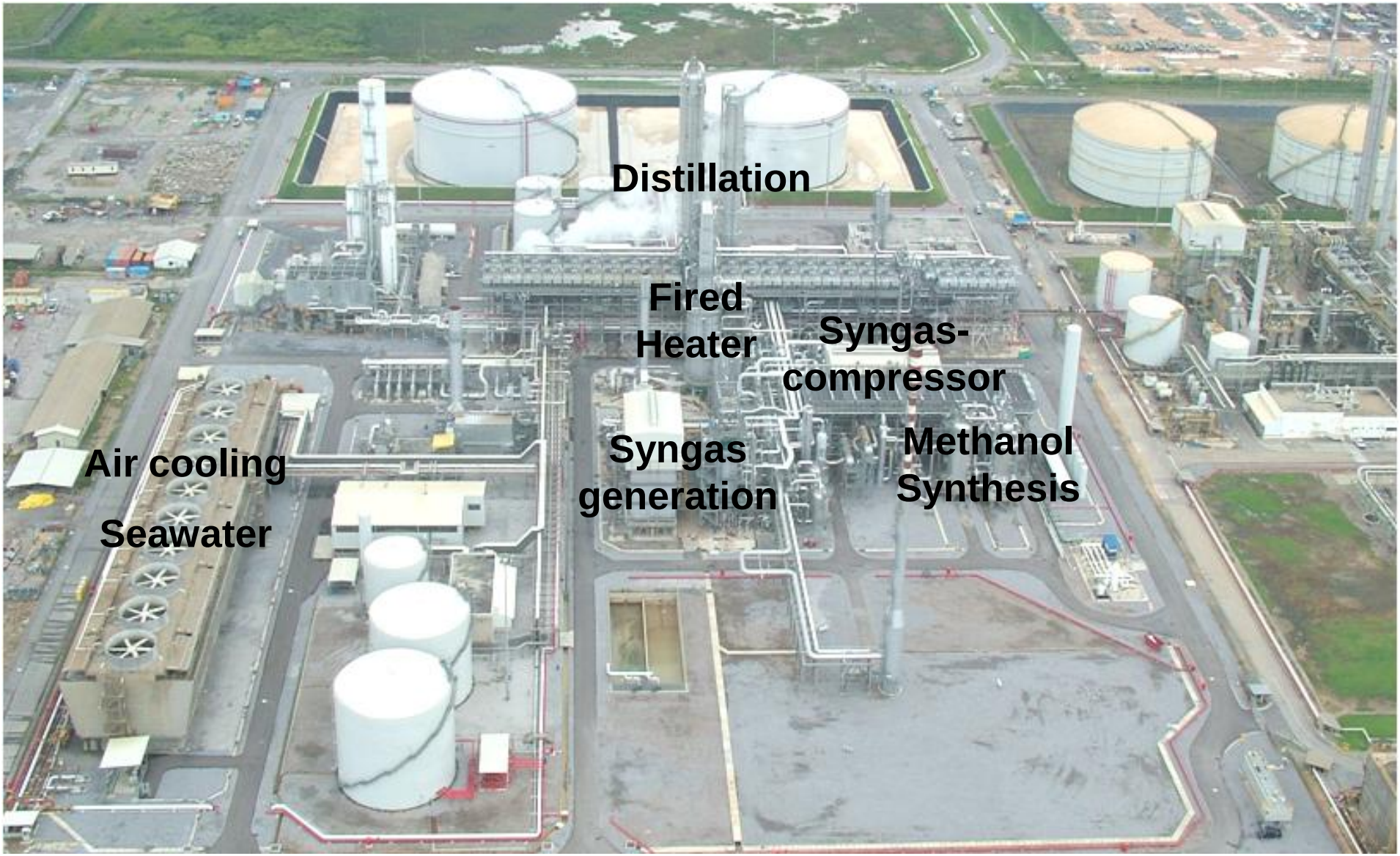
GigaMethanol Project

- Consisting of two trains producing 20 000 ton methanol per day
- Second train is a 100 percent copy of the first, together with common utilities resulting in expected cost savings of 30 – 40 percent for the second train
- Resulting in a yearly production of 7 million ton methanol, representing 15 percent of today's world methanol production

The ATLAS plant - the mother of MegaMethanol® and the foundation of GigaMethanol

Plant located in Trinidad, one single train, design capacity: 5 000 tpd

In 2008: 360 operational days at 108% of the design capacity

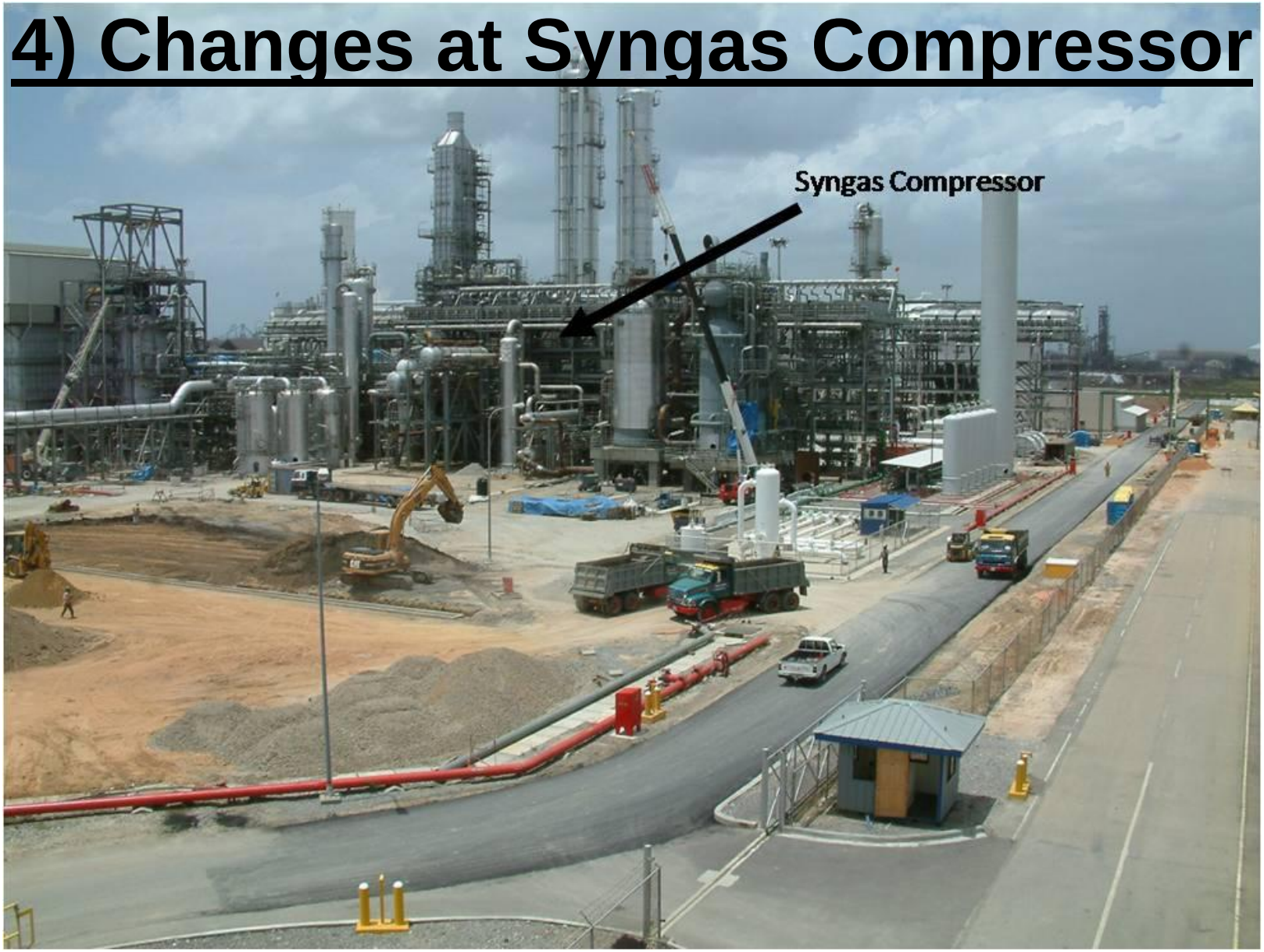

Distillation
Fired Heater
Syngas-compressor
Air cooling
Seawater
Syngas generation
Methanol Synthesis

1) Changes at Gas Generation

2) Changes at Methanol Synthesis

3) Changes at Distillation

4) Changes at Syngas Compressor



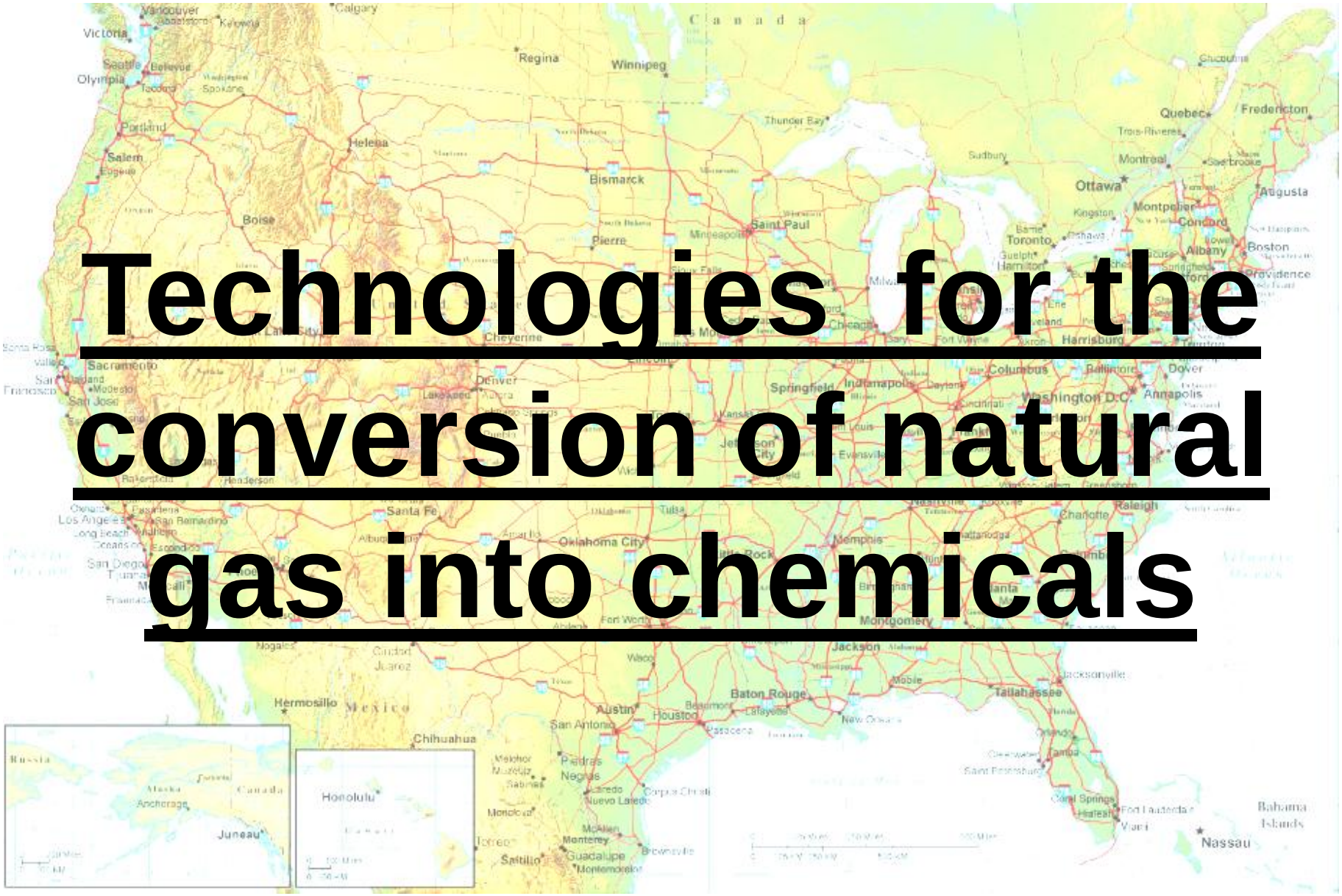
5) Changes at Fired Heater

6) Changes at Utilities/ Sea water Cooling

Summary GigaMethanol technology

In the sum:

With only *acceptable increased investment cost* the production can be increased from *5 000 tpd* up to *10 000 tpd* using equipment proven and utilised in the ATLAS plant!



Technologies for the conversion of natural gas into chemicals

Conversion of Syngas into Petrochemicals

- Fischer-Tropsch

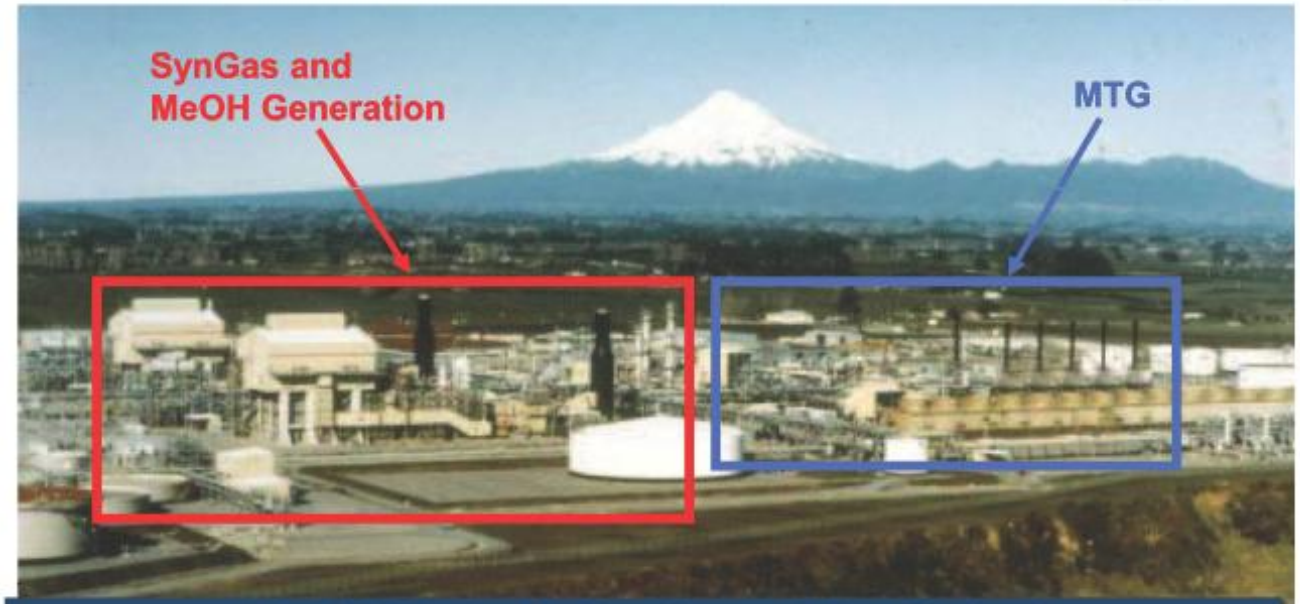
Known Methanol Conversion Technologies

- Methanol to Gasoline (MTG)
- Methanol to Propylene (MTP)
- Methanol to Olefins (MTO)

Methanol to Gasoline (MTG)

- Today the **only proven** methanol conversion technology
- Can be licensed from ExxonMobil
- Used in New Zealand in the past, improved significantly since that time
- In 2009 an optimised plant in Jincheng (China) started successfully and it is running well
- Chinese plant = reference for all MTG projects

NEW ZEALAND MTG FACILITY: NEW PLYMOUTH NZ



14,500 BPD plant in New Plymouth New Zealand.

Plant ownership 75% NZ Government and 25% ExxonMobil.

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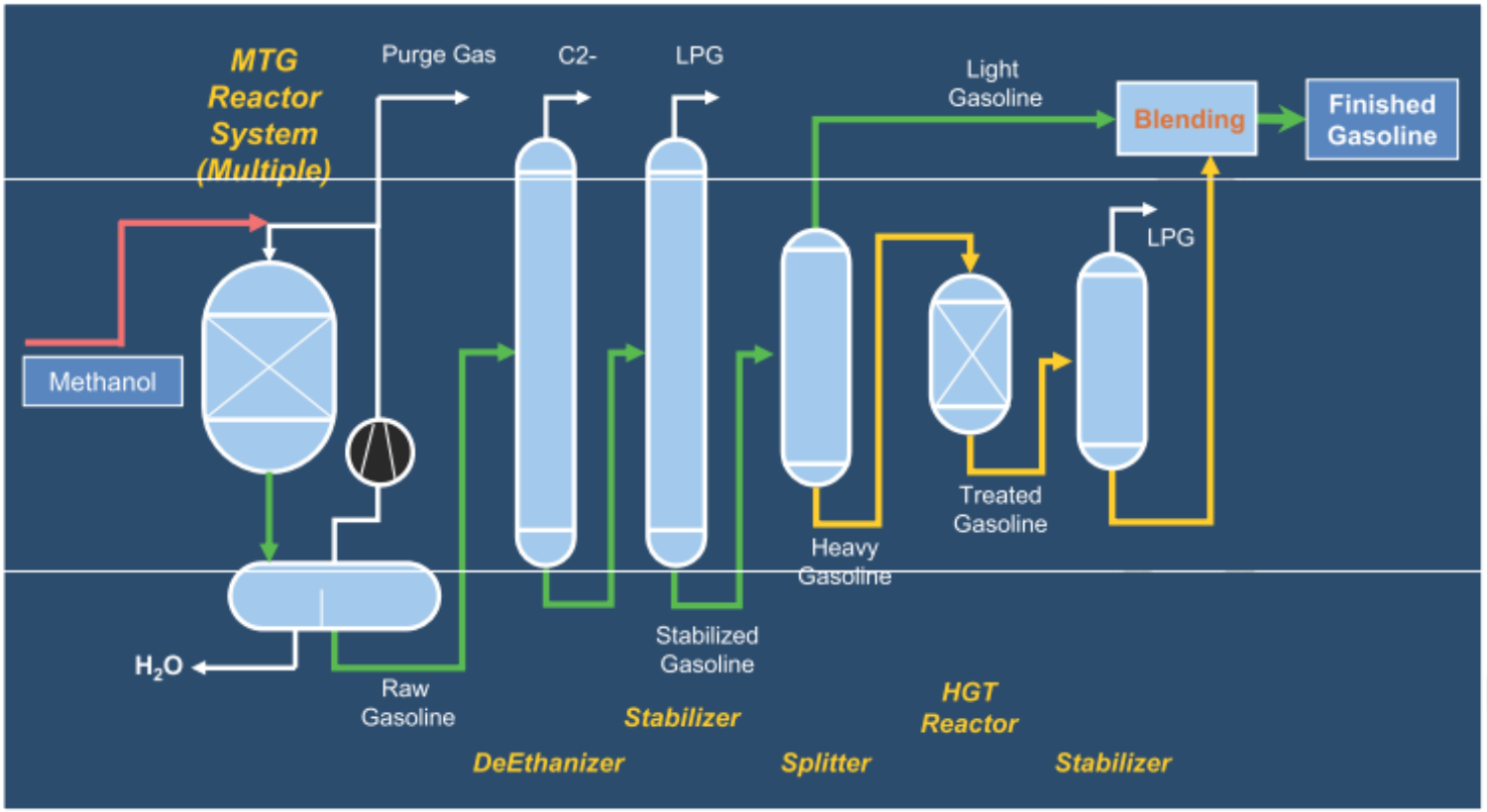
Research and Engineering

EMRE MTG Process Flow Diagram



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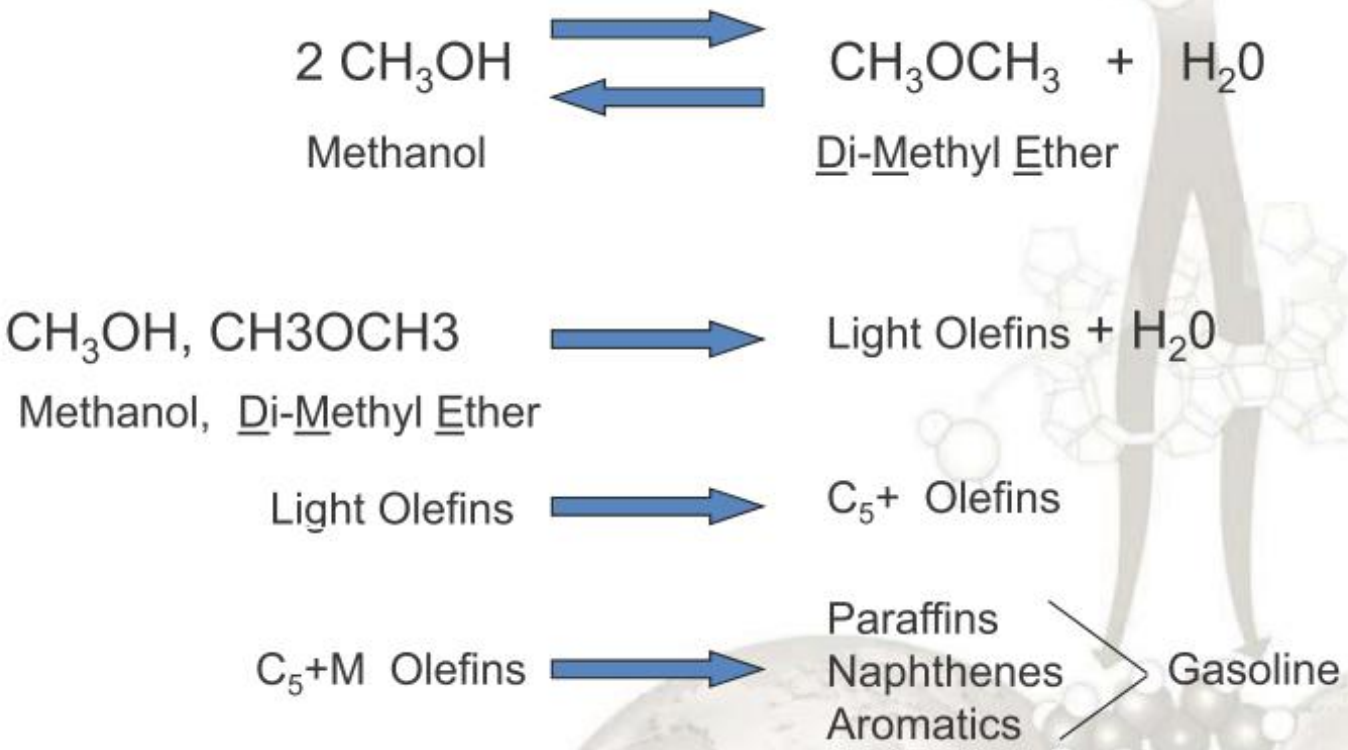
MTG REACTION PATH



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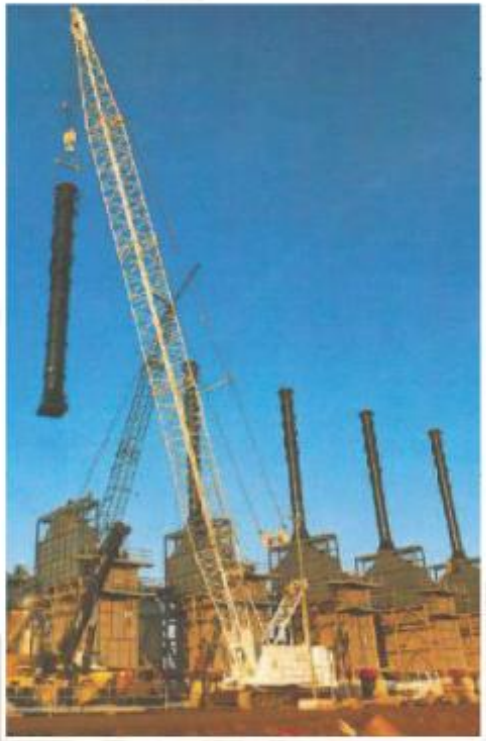
2ND GENERATION MTG TECHNOLOGY

- Second Generation Design based on 10 years learning's from New Zealand operation
- Improved heat integration
- Improved process efficiency

Reduced capital cost

Reduced operating cost

ExxonMobil is the world leader In catalyst development and manufacture



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World's First Coal to Liquids Plant using MGT

- Jincheng Anthracite Mining Group (JAMG) plant in Shanxi Province China is the first 2nd generation MTG Plant

- The JAMG complex is demonstrating the coal to gasoline concept with Chinese gasification technologies

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MTG YIELDS AND PROPERTIES/COMPOSITION

MTG GASOLINE YIELDS		
	Percent of Feed	Percent of Hydrocarbon Product
Gas	1%	2%
LPG	5%	11%
Gasoline	38%	87%
H_2O	56%	-

MTG GASOLINE PROPERTIES/COMPOSITION	
Octane, RON	92
Octane, MON	82
(R+M)/2	87
Paraffins, vol%	53
Olefins, vol%	12
Napthenes, vol%	9
Aromatics, vol%	26
Benzene, vol%	0.3
Sulfur	nil

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MTG Gasoline vs. U.S. Conventional Gasoline

- MTG Gasoline is completely compatible with conventional gasoline
- MTG Gasoline contains essentially no sulfur and low benzene

	2005 Summer	2005 Winter	MTG Gasoline	US Regulation
API Gravity	58.4	61.9	61.8	
Aromatics (%Vol)	27.7	24.7	26.5	
Olefins (%Vol)	12	11.6	12.6	
RVP (psi)	8.3	12.12	9	
T50 (F)	211.1	199.9	201	
T90 (F)	330.7	324.1	320	
Sulfur (PPM)	106	97	0	30
Benzene (%Vol)	1.21	1.15	0.3	1 (0.62)

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F-T & MTG Component Yields

Components	Fischer-Tropsch Co Catalyst @ 220 C	Fischer-Tropsch Fe Catalyst @ 340 C	MTG
Fuel Gas	6	15	1.1
LPG	6	23	10.0
Naphtha	19	36	
GASOLINE			**88.8**
Distillate/Diesel	22	16	
Fuel Oil/Wax	46	5	
Oxygenates	1	5	

- F-T yields depend on catalyst, temperature and specific technology
- F-T processes produce a range of hydrocarbons and oxygenates that require refining processes to convert F-T liquids to conventional fuels
- MTG produces a conventional gasoline and an LPG stream

Data Sources: Sasol 2004 publication.

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2009 NRC STUDY: LIQUID TRANSPORTATION FUELS FROM COAL / BIOMASS

F-T & MTG Economic Comparison

		Fischer-Tropsch No CO_2 Capture	Fischer-Tropsch With CO_2 Capture	MTG No CO_2 Capture	MTG With CO_2 Capture
INPUT	Coal, tpd (as received)	26,700	26,700	22,900	23,200
OUTPUTS	Diesel, bpd	28,700	28,700		
	Gasoline, bpd	**21,290**	**21,290**	**50,000**	**50,000**
	Total Liquid Fuel, bpd	50,000	50,000	50,000	50,000
	Electricity, MW e	427	317	145	111
	THERMAL EFF. (LHV)	**49.1%**	**47.6%**	**54.2%**	**52.9%**
	TOTAL PLANT COST ($M)	4,880	4,950	3,940	4,020
	TOTAL PLANT COST ($K/bpd)	97.6	98.9	78.8	80.4
	EST. BREAKEVEN CRUDE PRICE ($/BBL)	56	68	47	51

- The study indicated the MTG based plant had slightly higher overall efficiency and lower construction costs
- CO_2 Sequestration lowered efficiency by about 1.5% and raised costs 1.5-2%

Data Sources: Liquid Transportation Fuels from Coal and Biomass, © National Academy of Sciences, 2009; http//www.nap.edu/catalog/12620.html

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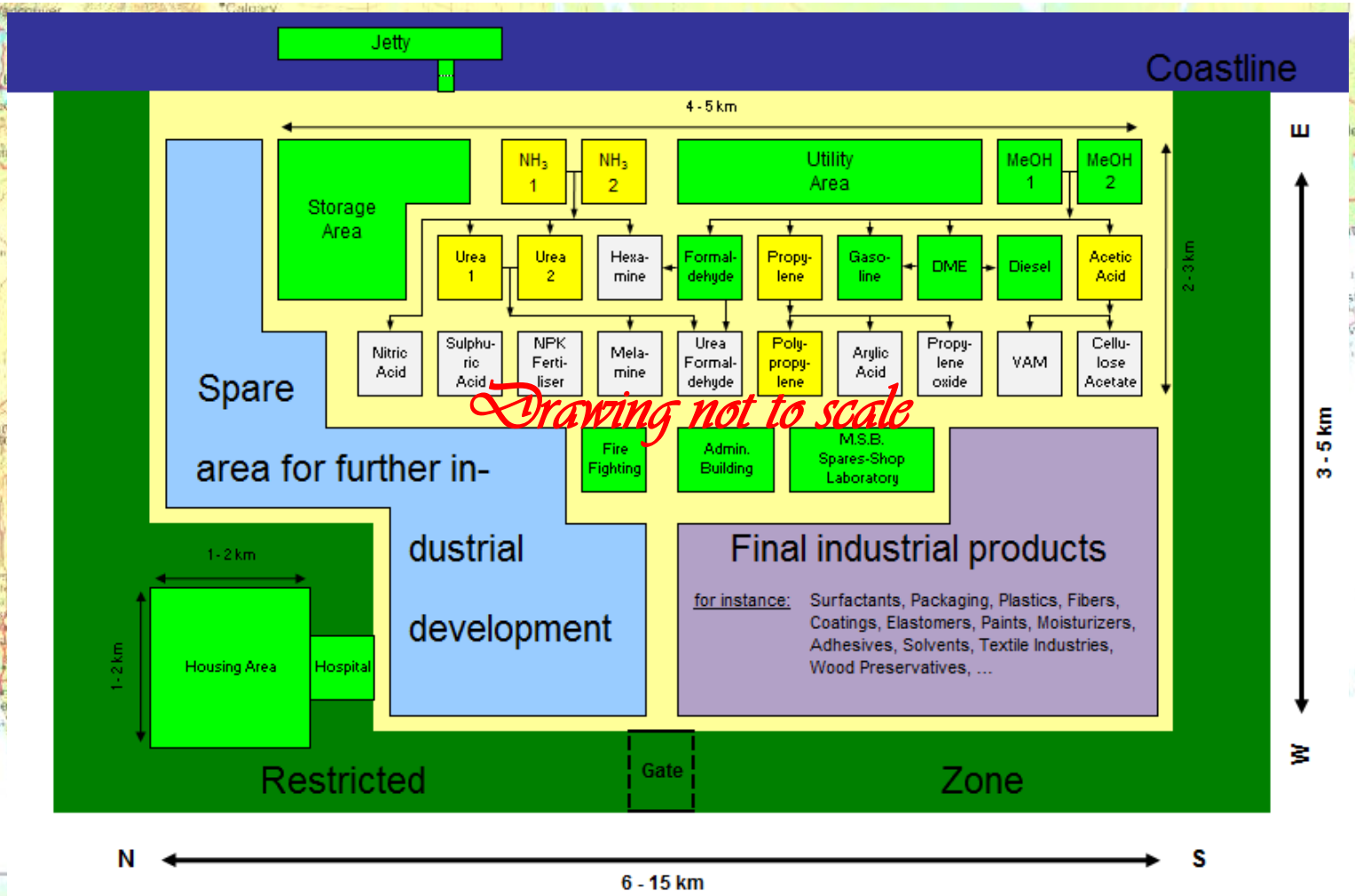
Natural Gas-Based Industrial Complex



MeOH = Methanol, 1+2 = 20,000 tpd
NH_3 = Ammonia, 1+2 = 10,000 tpd
Urea = Fertiliser, 1+2 = 6,000 to 8,000 tpd

DME = Dimethyl ether (fuel)
VAM = Vinyl acetate monomer
Utilities = Electrics, Water (drinking, raw, cooling, demin), O_2 and N_2, Instrument air

First Phase
Second Phase
Third Phase


Thank you
very much!