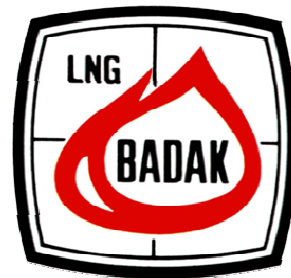


NGL Recovery Project at Badak LNG Plant

**23rd World Gas Conference
5-9 June 2006
Amsterdam – The Netherlands**



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**PT Badak NGL
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Safety Message

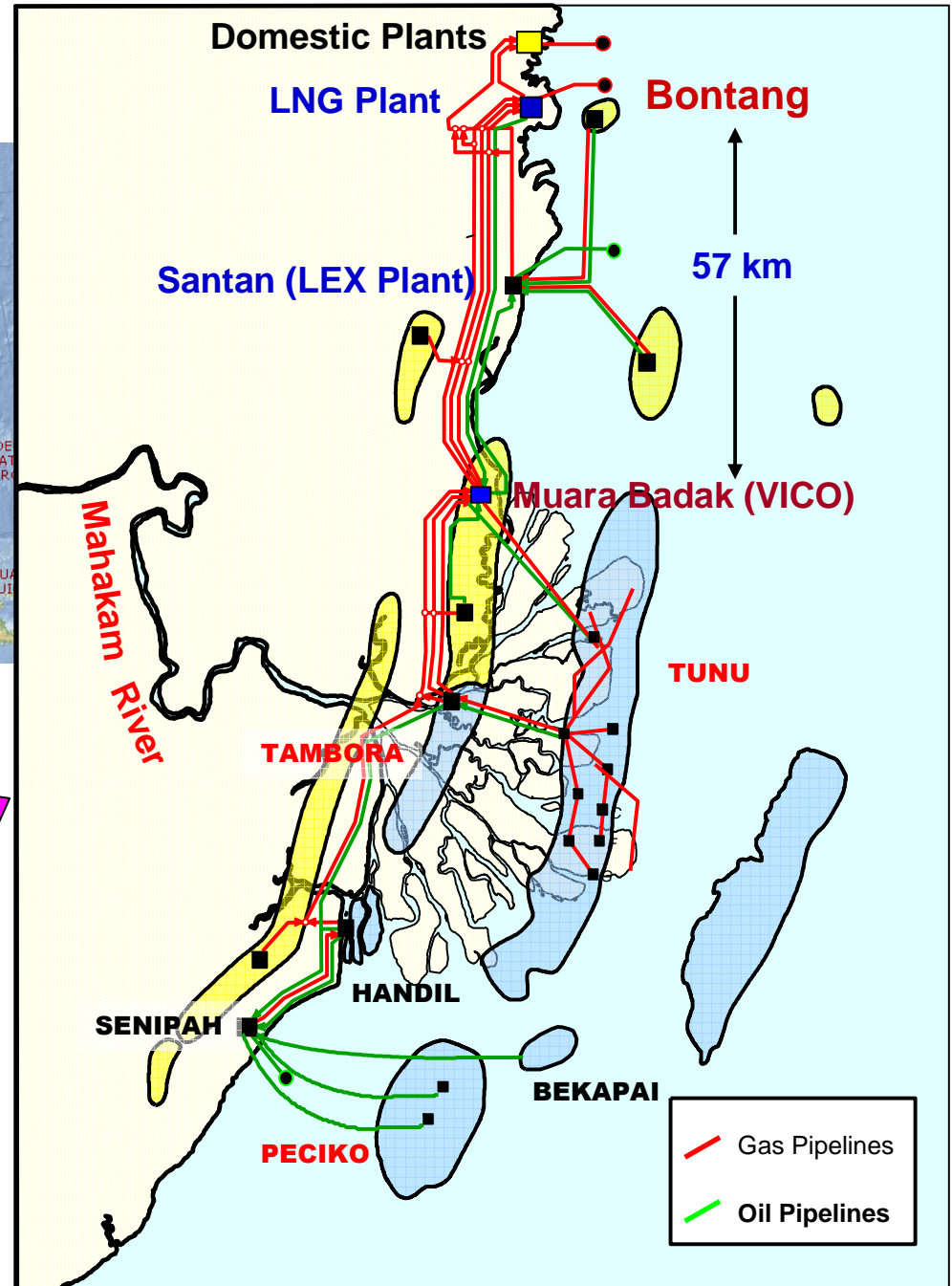
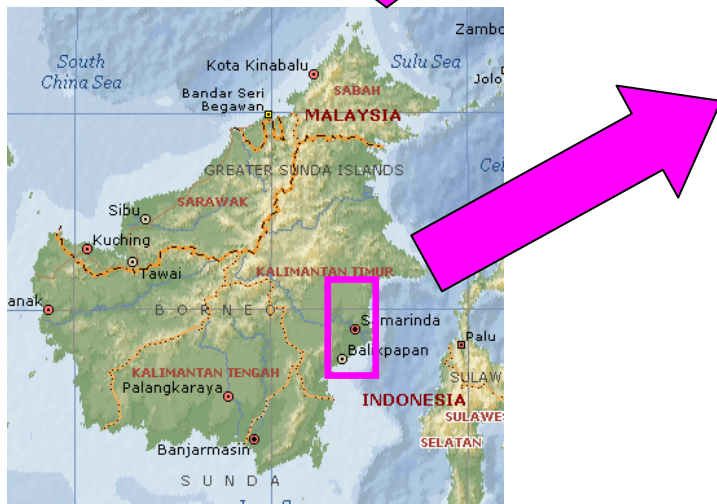
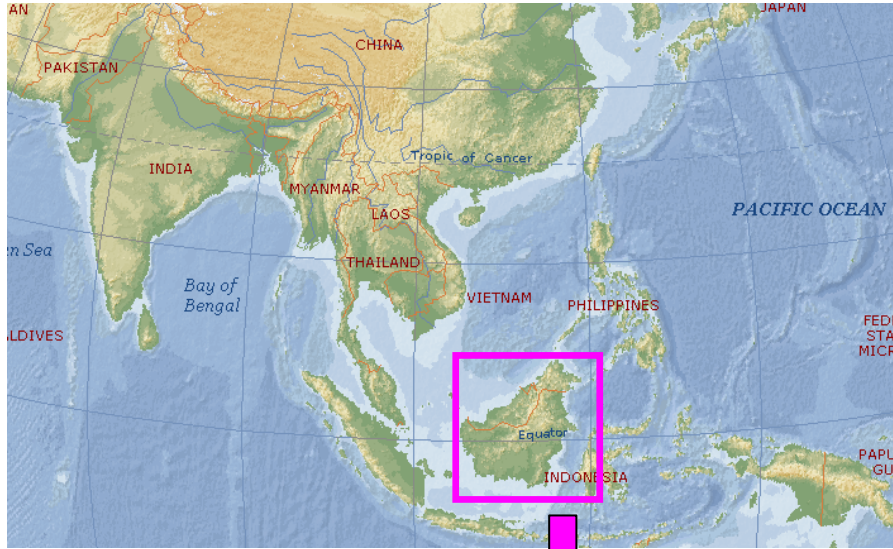
Safety is Endless Efforts



Agenda

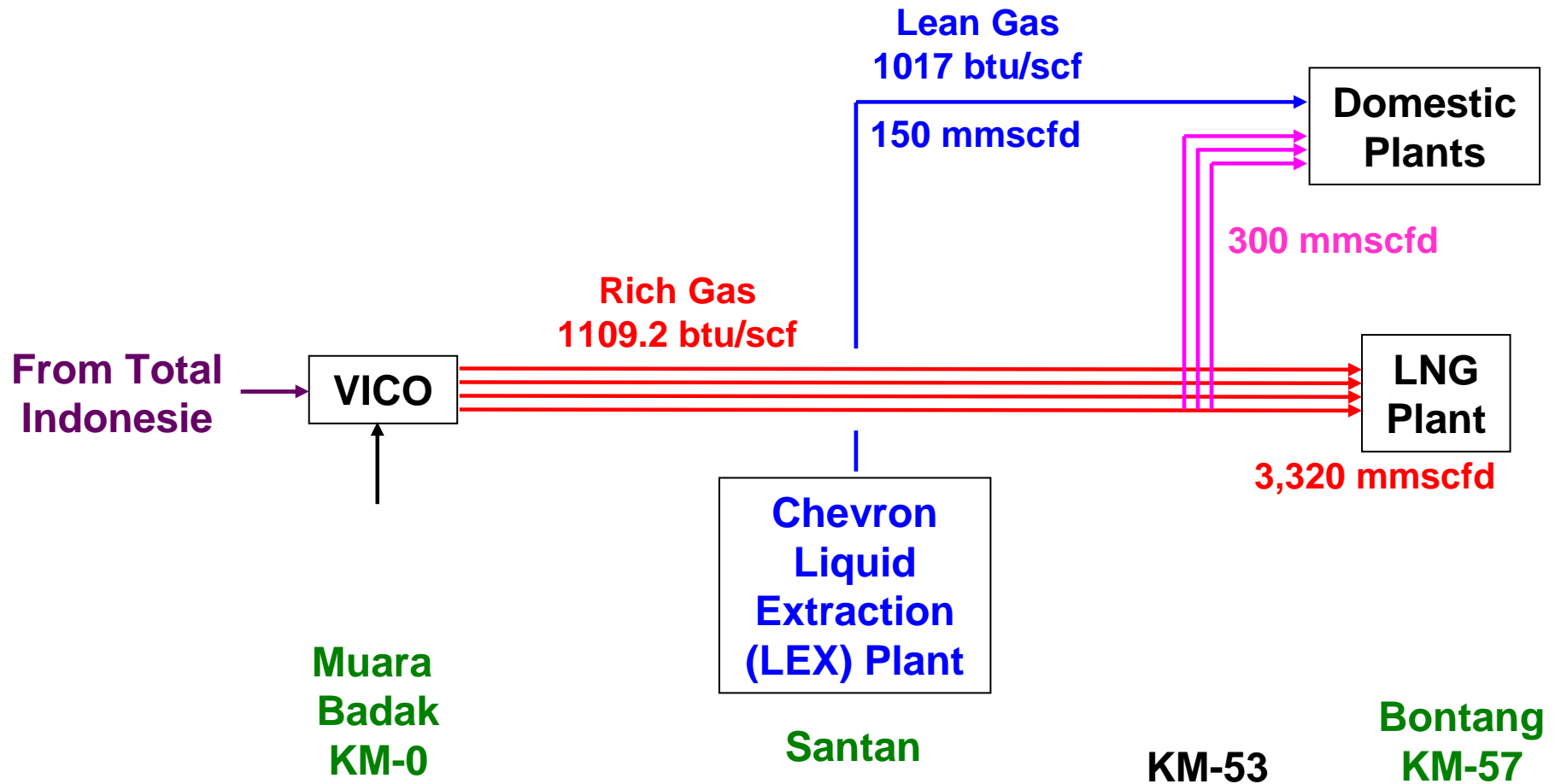
- **Background and Objective**
- **Project Scope**
- **Plant Location**
- **Material Balance**
- **Project Staging**
- **Conclusions**

East Kalimantan Gas Gathering and Pipeline System





East Kalimantan Gas Distribution





Domestic Plants

- **Fertilizer Plant: 4 Trains**
- **Ammonia Plants: 2 Plants**
- **Methanol Plant**
- **Gas delivery Contract: 457,055 mmbtu/d**
- **Supplied by 2 x 16", 20" rich gas, and 16" lean gas pipelines**

Badak LNG Plant

- **Train Number: 8 (A-H)**
- **Production Capability: 22.1 mtpa LNG, 1 mtpa LPG, 10 million bbl/yr condensate**
- **Supplied by 2 x 36" and 2 x 42" gas pipelines**



Feed Gas Condition

To LNG Plant

- Pressure: 45-47 kg/cm²g
- Temp : 27-32°C

To Domestic Plants

- Pressure: 35-40 kg/cm²g
- Temp : 27-32°C

Composition (Vol%)

Component	From Pipeline	Domestic Contract
N2	0.084	0 – 9
CO2	5.528	
C1	83.285	70 – 99
C2	5.215	0 – 12
C3	3.482	0 – 8
iC4	0.718	0 – 5
nC4	0.823	
iC5	0.261	
nC5	0.167	
C6+	0.437	
HHV	1109.2	950–1200

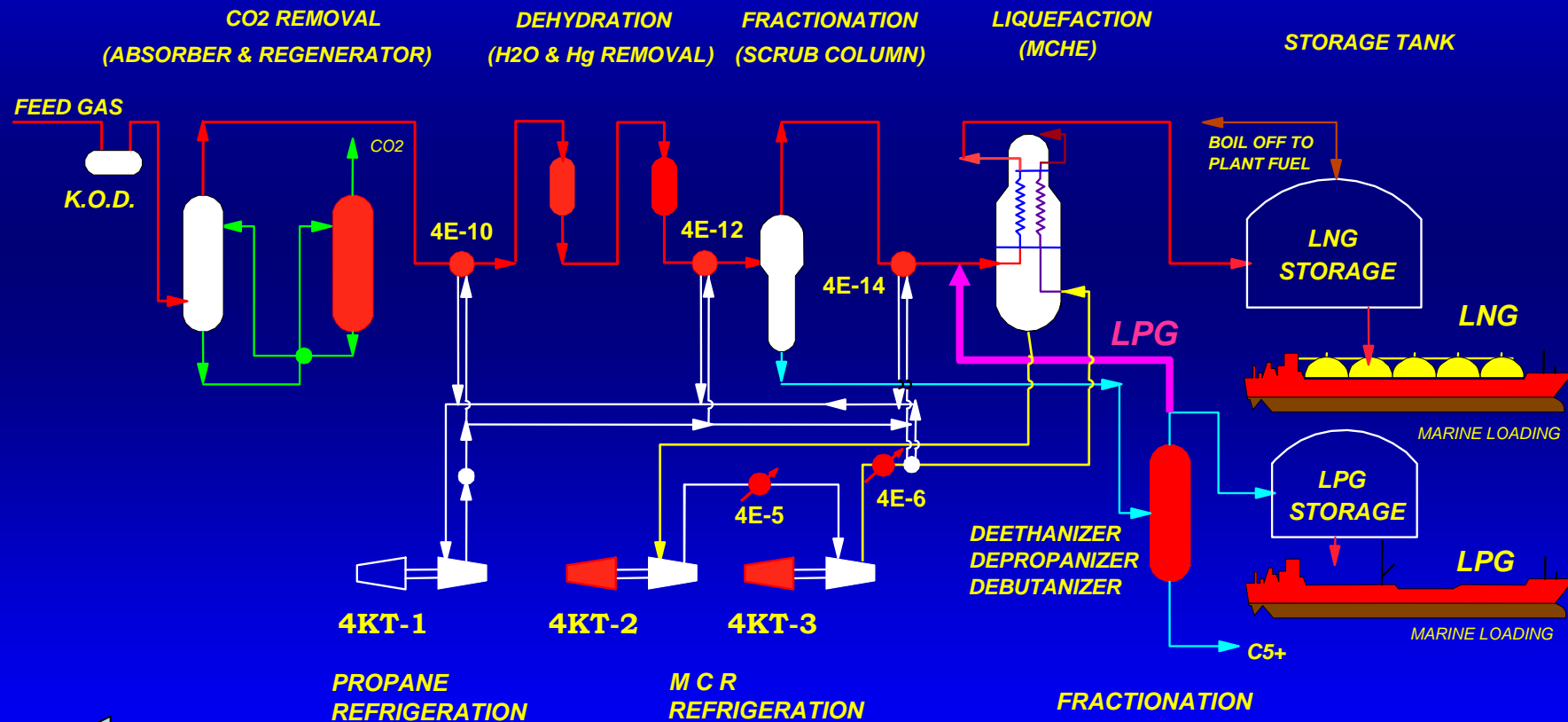
HHV in BTU/SCF



Current Situations

- Feed Gas price to Domestic Plants is cheap
- Domestic Plants require primarily methane
- Price of heavier HC components is higher than methane
- Condensed hydrocarbon in pipeline transmission to Domestic Plants is flared
- Part of LPG Component is recombined with LNG to maintain LNG heating value (LPG price is higher than LNG price) ▶
- So, supplying lean gas instead of rich gas to Domestic Plants will benefit from:
 - replacing LPG component in LNG with C2
 - recovering LPG & Condensate from rich gas
 - eliminating flared condensed HC

LNG Plant Process Overview



Objective

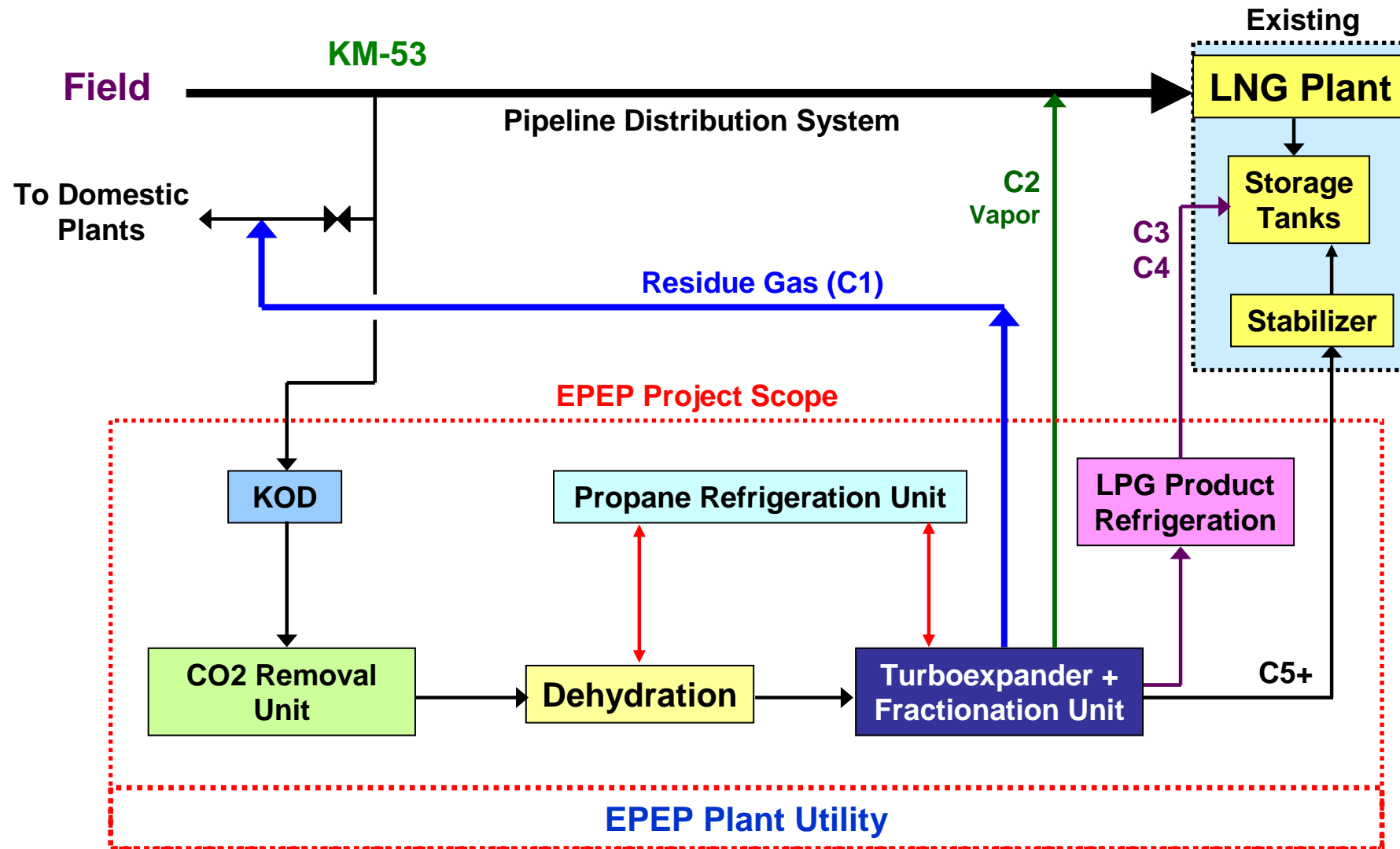
NGL Recovery

Ethane Plus Extraction Plant (EPEP) Project

- **To recover 99.2% of ethane and 100% components heavier than ethane from pipeline rich gas delivered to Domestic Plants**
- **To eliminate the flared condensed hydrocarbon in pipeline to Domestic Plant**

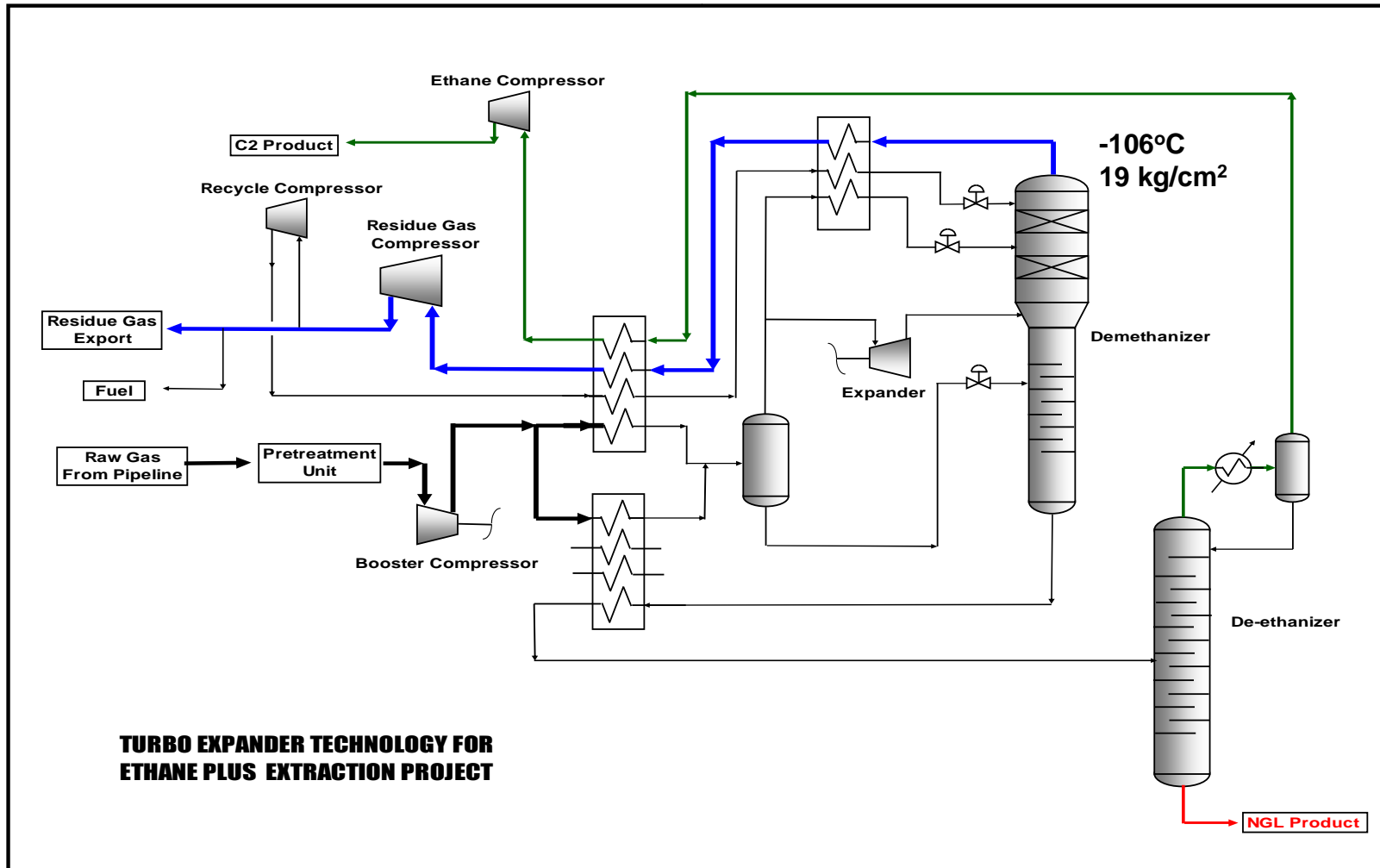


Project Scope





Turboexpander Unit





EPEP Plant Characteristics

- High NGL recovery: **99.2% of C2 and 100% of other heavier HC components**
- Highly Energy-efficient plant: **fuel consumption 4.2% of its feed (Plant thermal efficiency of 95.8%)**



EPEP Plant Utilities

- Hot Oil: 5,000 m³/h, WHRU Preheater + Furnace
- Electricity: Gas Turbine Generator, 3 x 50%
- Air : Instrument, Utility (**compressor 3 x 100%**)
- Nitrogen: Cryogenic and PSA Units (**2 x 100%**)
- Fuel Gas: High, Medium and Low Pressures
- Wastewater Treatment
- Smokeless Flares and Blowdown: LTCS, LTSS, Wet Flares, Liquid Drain Collection and burnpit
- Water Storage (**supplied from LNG Plant**) : Amine water makeup, Potable, Utility & Fire Suppression Water System
- Air cooling system



Conical zone

Location

R 1830m

SWL 38m

EPEP Plant

Condensate stab unit

CONDENSATE TANKS

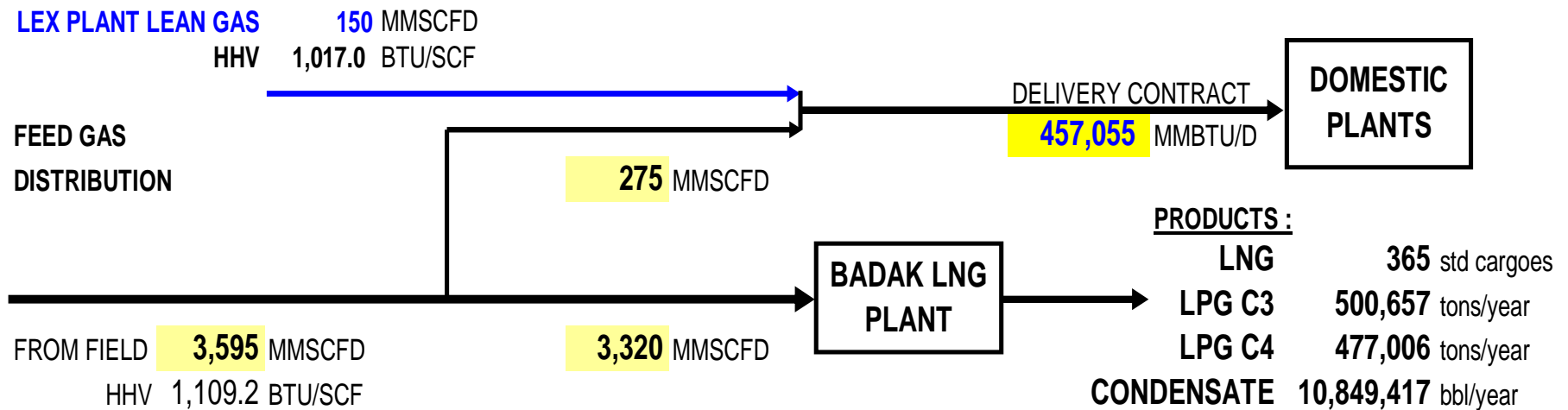
R 3,354m

AIR STRIP APPROACH

LPG TANKS

Material Balance

Before EPEP Project

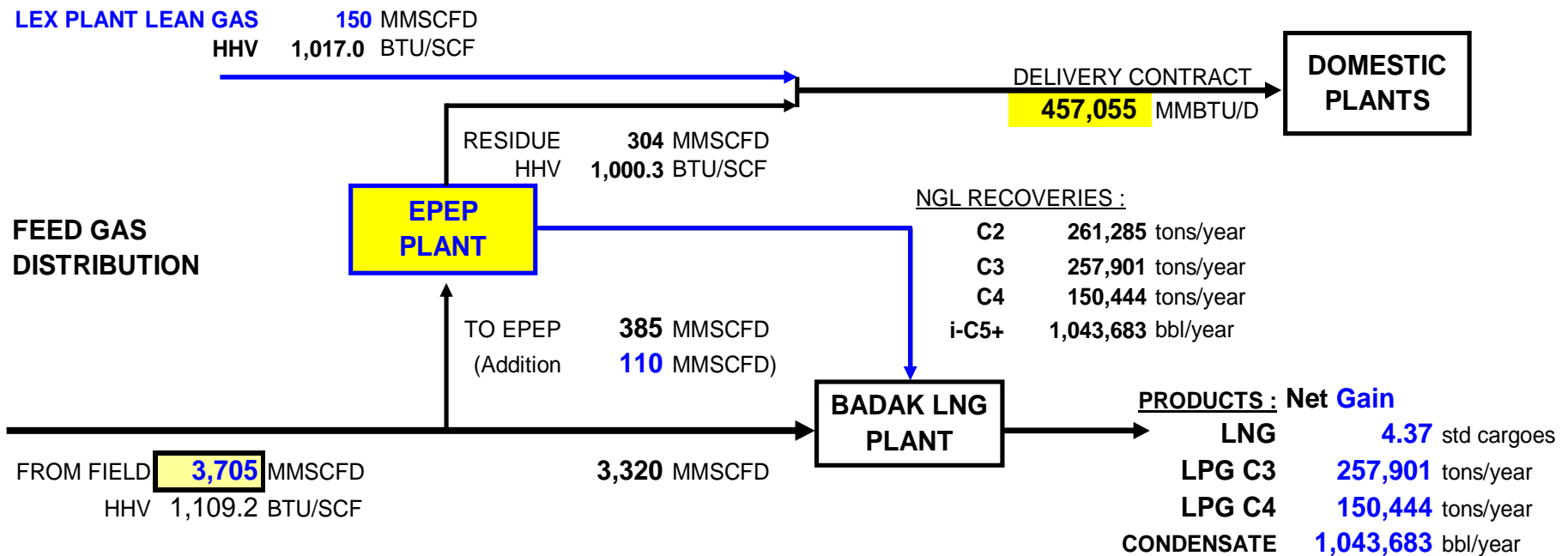


1 LNG std cargo = 125,000 m³



Material Balance

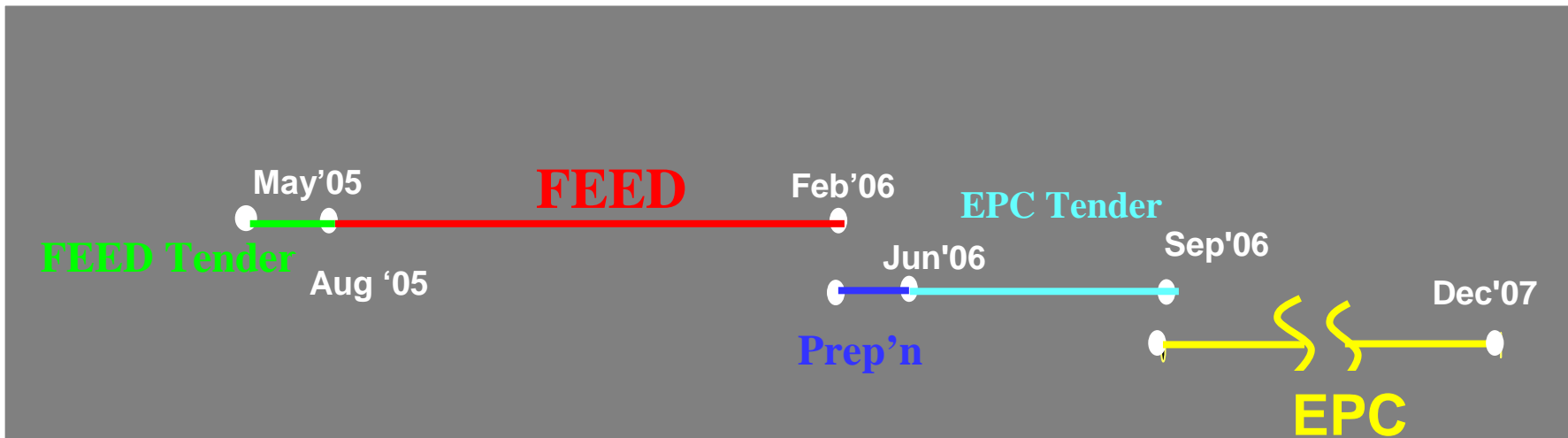
After EPEP Project



110 mmscfd additional rich gas to EPEP Plant is required for

- **Makeup for energy shrinkage : 94 mmscfd**
- **EPEP Fuel consumption : 16 mmscfd (4.2% of EPEP Feed)**

Project Staging



Conclusions

- **EPEP Plant will be capable of recovering 99.2% of C2 and 100% of heavier HC components from rich gas by Turbo-expander technology**
- **EPEP Project will gain additional production up to 4.4 std cargoes LNG, 0.4 mtpa LPG and 1 M bbl condensate by NGL recovery from rich gas delivered to Domestic Plants**
- **EPEP Plant is energy efficient with fuel consumption of 4.2% from its feed**
- **EPEP Plant will require 110 mmscfd additional gas supply for residue gas energy shrinkage and plant fuel consumption**

Thank You

