



THE INDONESIA OLEFIN,
AROMATIC & PLASTIC
INDUSTRY ASSOCIATION

Forum Energizing Indonesia

**Ikatan Alumni Departemen Teknik “Gas & Petrokimis / Kimia”
Fakultas Teknik Universitas Indonesia**

Migas & Transisi Energy

Jakarta 16-17 Maret 2022 Jam 19.00-21.45

**Disiapkan oleh
Team**

The Indonesian Olefin, Aromatic & Plastic Industry (INAPLAS)

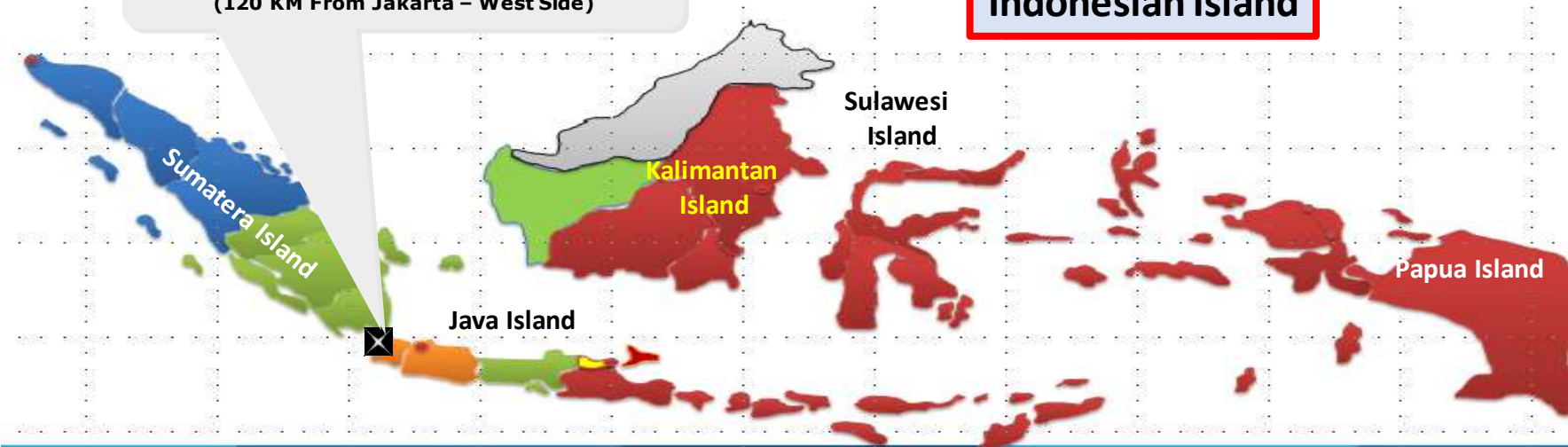
Agenda

- 1** Overall Business Process & Infrastructure
Of PT. Chandra Asri Petrochemical Tbk.
- 2** Multiplier Effect Of Petrochemical
Industry.
- 3** Supply & Demand balance
Domestic Petrochemicals products
- 4** Existing Projects &
Overview Future CAP-2 Projects
- 5** Q & A

Where We are ? (PT. Chandra Asri Petrochemical Tbk)

PT. Chandra Asri Petrochemical Tbk.
Cilegon –Banten –Java Island
(120 KM From Jakarta – West Side)

Indonesian Island



Java Island

Location-3
Bojonegara (SMI)
(20 Hectares)
2 Plants

Jakarta

Chandra Asri

Location-2
Anyer (PP)
(16 Hectares)
3 Plants

Location-1
Anyer (OPE)
(120 Hectares)
8 Plants



ANYER - CILEGON - MERAK INDUSTRIAL AREA
PROVINSI BANTEN
 Indonesia

Location-1 (120 Ha)
 1. Cracker Plant – Lummus-USA
 2. PE Plants Unipol - USA
 3. PE Plant Showadenko- Japan
 4. New PE Plant-Univation-USA
 5. Butadiene plant- USA
 6. MTBE-Plant-Lummus-USA
 7. Butene1 Plant Lummus-USA
 8. Synthetic Rubber-Michelin France

Location-2 (16 Ha)
 3 Train PP Plants-Grace-USA

Location-3 (20 Ha)
 2 Train SM Plants-Badger-Lummus-USA

Garis Biru
 Pipa Ethylene Chandra Asri
 Hingga 45 KM

Garis merah adalah Jalan Raya Anyer

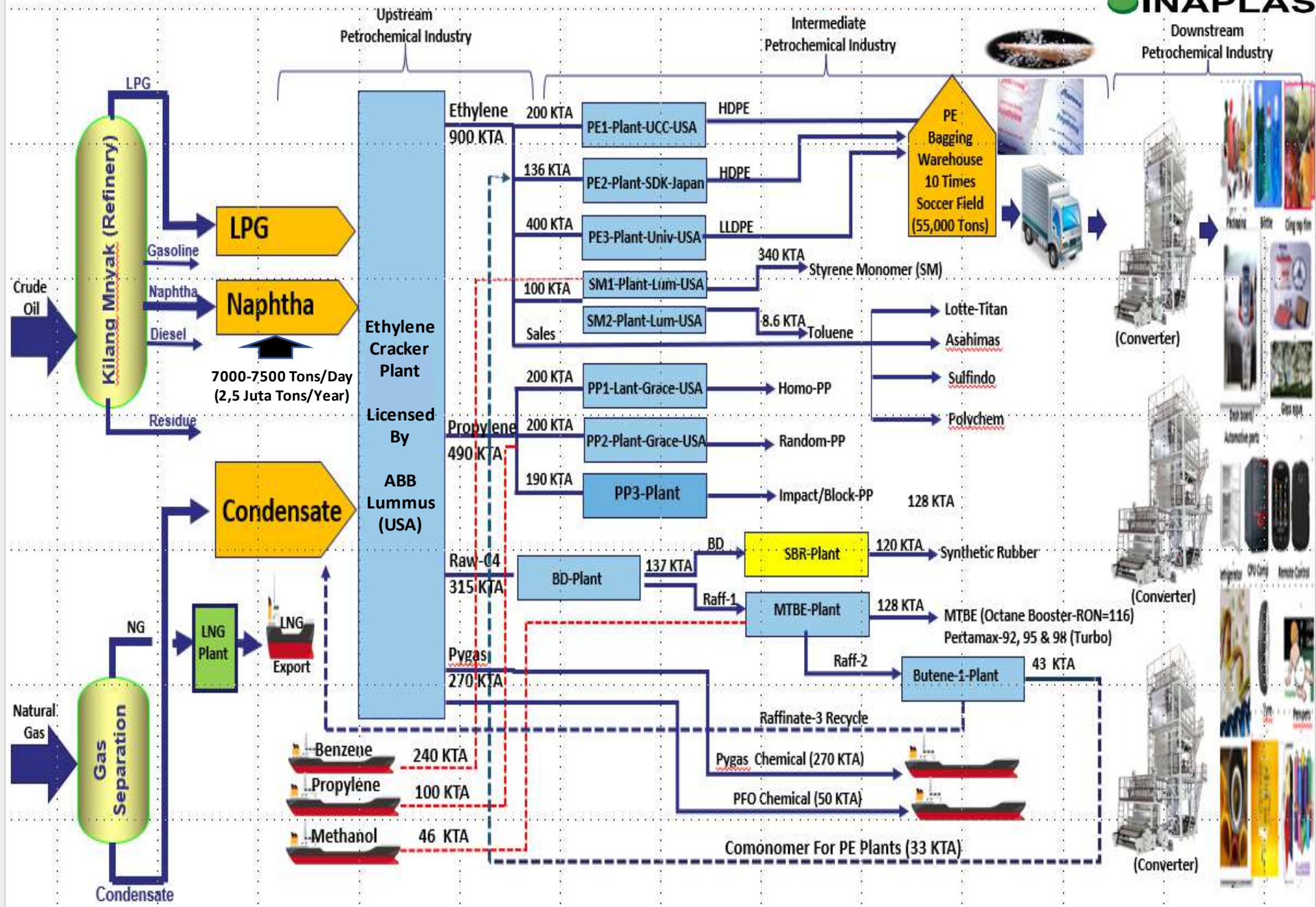
Upstream Plant Petrochemical

Public Road
Secondary Road
Road
Future Secondary Roads
Pipe Line

Industrial Plants and Facilities:

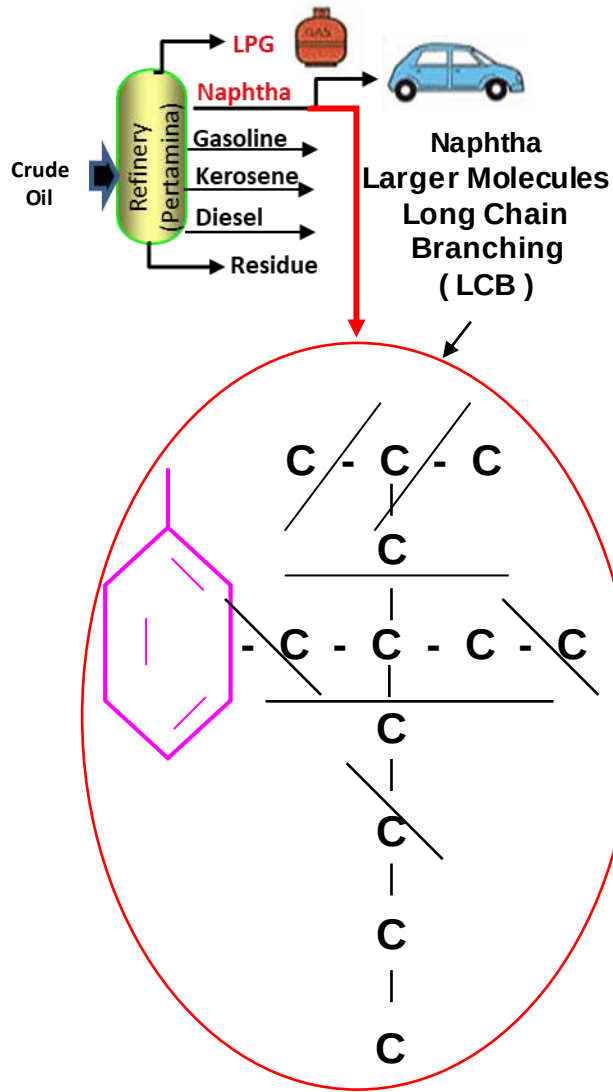
- Suralaya Power 1,800 MW + 1,800 MW
- Satomo Monomer EDC (265,000 MTY)
- VCM (400,000 MTY)
- Satomo Polymer PVC (105,000 MTY)
- Showa Esterindo (10 MTY)
- Sriwijaya (10 MTY)
- Indochlor
- Multisidia
- Poulenc SBL (30,000 MTY)
- Sulfindo Adiusaha NaOH (215,000 MTY), CL₂ (20,000 MTY)
- Styrene Monomer Ind. SM (100,000 MTY to 200,000 MTY)
- Redeco / Polychem PS (32,000 MTY)
- GT Petro MEG (216,000 MTY), SBR (60,000 MTY)
- Cont Carbon Ind CB (24,000 MTY)
- Trans Bakrie
- Risjad Brasali
- Golden Key
- EPS (15,000 MTY), SAN (15,000 MTY), ABS (20,000 MTY)
- P. Panjang
- P. Merak
- Buana Sulfindo
- Statomer PVC (82,000 MTY)
- Prointail
- Unggul Indah AB (210,000 MTY)
- PIPI PS (48,000 MTY), SBL (30,000 MTY)
- Shi Chemical Indonesia PTA (500,000 MTY)
- AMOCO Mitsui PTA (350,000 MTY)
- Pertamina Tanjung Gerem
- PENI PE (440,000 MTY)
- Lotte
- UAP
- Cabot
- Siemens
- KS
- Dystar
- Rhom & Hass
- KS Road '95
- TOLL ROAD '95
- South Cilegon By-Pass '03
- Chandra Asri By-Pass '00
- Jl Raya Anyer
- Anyer
- Chandra Asri
- Sriwie
- Tri Polyta PP (60,000 MTY)
- Dongjin Hydrazin Hydrate (7,000 MTY)
- Lautan Otsuka Hydrazin Hydrate (4,000 MTY)
- Polypet PET (40,000 MTY)
- Polypriam (40,000 MTY)
- APCO (40,000 MTY)
- ABG (40,000 MTY)
- Acrylic Acid (60,000 MTY)
- Ethyl Acrylate (20,000 MTY)
- N-Bithyl Acrylate (40,000 MTY)
- 2-Ethylhexyl Acrylate (40,000 MTY)
- Ethylene (510,000 MTY)
- Propylene (240,000 MTY)
- LLDPE (200,000 MTY)
- HDPE (100,000 MTY)
- Java Manis Rafinasi
- KS Port
- KBS
- Unggul Indah AB
- PIPI PS
- Shi Chemical Indonesia
- AMOCO Mitsui
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- Sriwie

Relationship Oil & Gas and Olefin Based Petrochemical Industry (Upstream, Intermediate & Downstream)

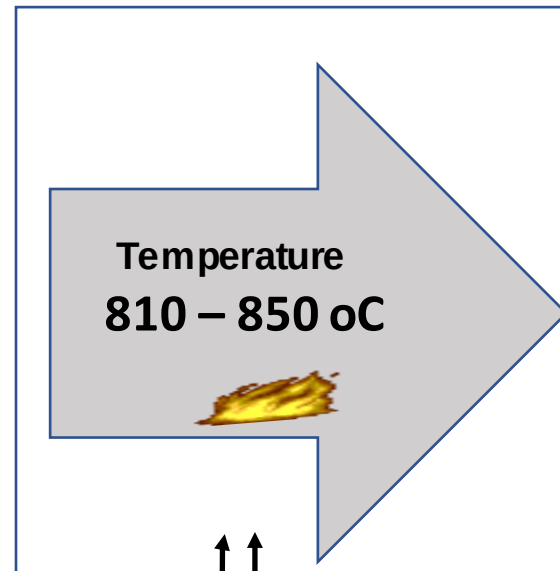


4. What We Are Doing In Upstream Petrochemical Plant

To Crack Naphtha become small-small Molecules
Thru Steam Thermal Cracking Process



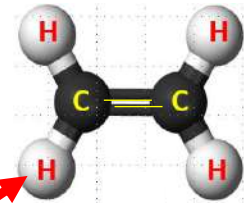
Furnace



**Thermal
Steam Cracking Process**

Smaller Molecules
Short Chain
Branching
(SCB)

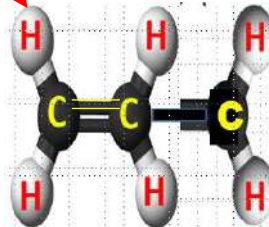
Double
bond C2



1. Ethylene (C₂H₄)

2. Propylene (C₃H₆)

Double
bond C3



3. Crude (C₄)

4. C - C - C



PYGAS (C₆-C₈)

5. by products

1. Hydrogen [C=0]
2. Methane [C=1]
3. Ethane [C=2]
4. Propane [C=3]
5. Crude C₅ [C=5]
6. C₉ [C=9]
7. PFO [C₁₀-C₁₃]

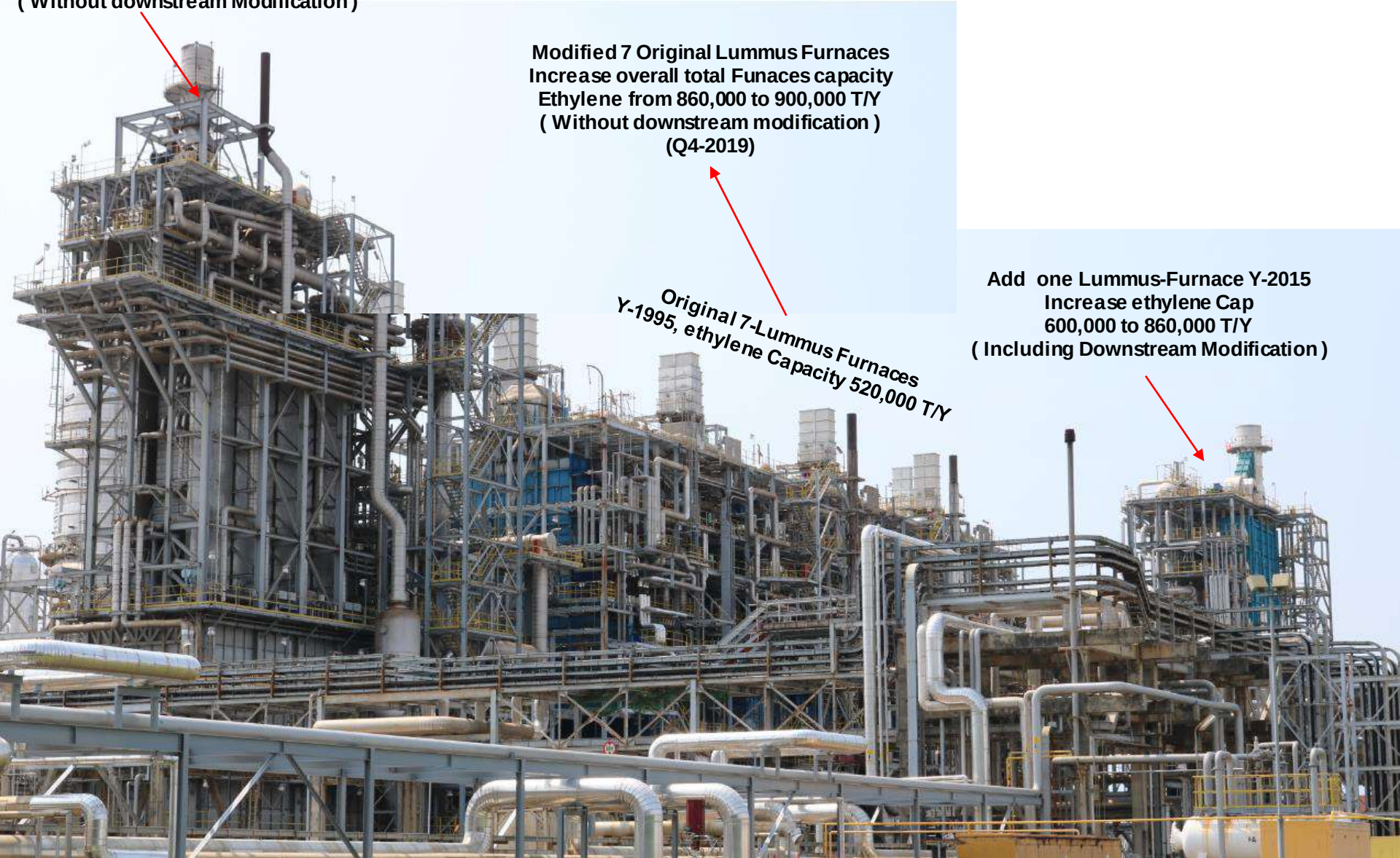
Furnaces the place to Crack Naphtha into Various Products
Thru Thermal Steam Cracking Process
(Currently Chandra Have Totally 9 Furnaces All Together)

Add one KBR-Furnace Y-2008
Increase ethylene Cap
520,000 to 600,000 T/Y
(Without downstream Modification)

Modified 7 Original Lummus Furnaces
Increase overall total Furnaces capacity
Ethylene from 860,000 to 900,000 T/Y
(Without downstream modification)
(Q4-2019)

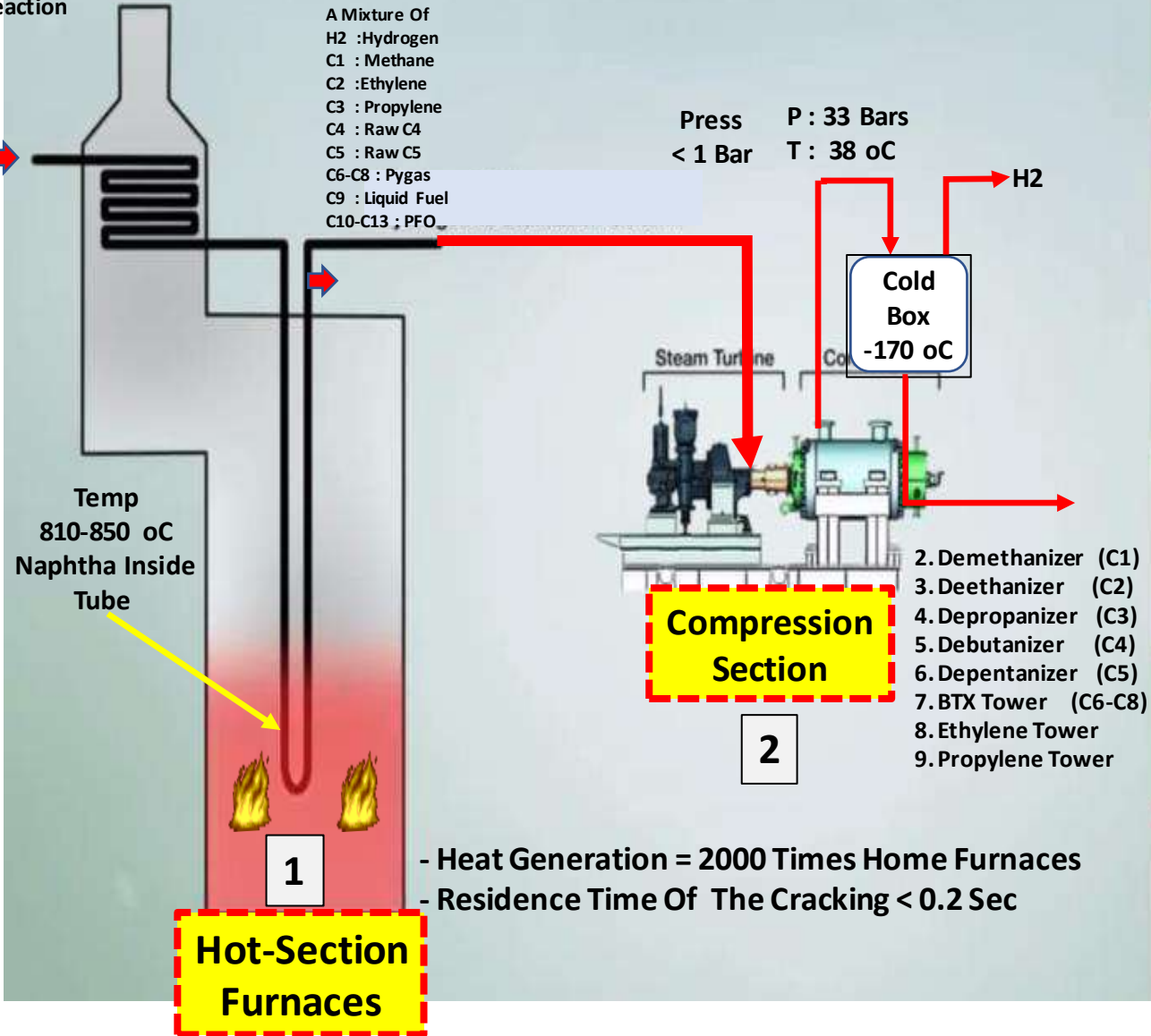
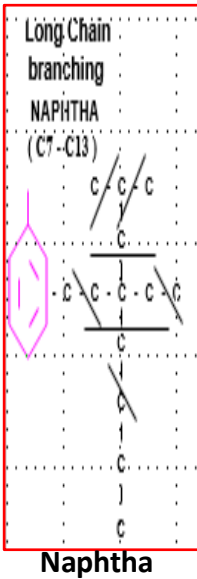
Original 7-Lummus Furnaces
Y-1995, ethylene Capacity 520,000 T/Y

Add one Lummus-Furnace Y-2015
Increase ethylene Cap
600,000 to 860,000 T/Y
(Including Downstream Modification)



Typical Simple Process Of Ethylene Cracker Plant (3 Steps Process)

- Conversion Mechanism
1. Thermo-Chemical Reaction
 2. Bio-Chemical Reaction
 3. Electro-Chemical Reaction
 4. Photo-Chemical Reaction



Simple Picture Naphtha Cracker Plant Chandra Asri



Push Button
Cracking Process

Naphtha

Hydrogen
Methane
Ethylene
Propylene
Crude C4
Crude C5
Pygas
C9
PFO

Compressor House

1
Demethanizer

Cold Box

2
Deethanizer

2a
Ethylene Fractionator

3
Depropanizer No.1

3a
Propylene Fractionator No.2

C3 Fractionator No.1

Gasoline Fractionator

Furnace

Quench Tower

4
Debutanizer

Depropanizer No.2

Caustic Wash Tower

Depentanizer

Acetylene Converter

6
BTX Tower

Sub Station

DPG Reactor

CCR

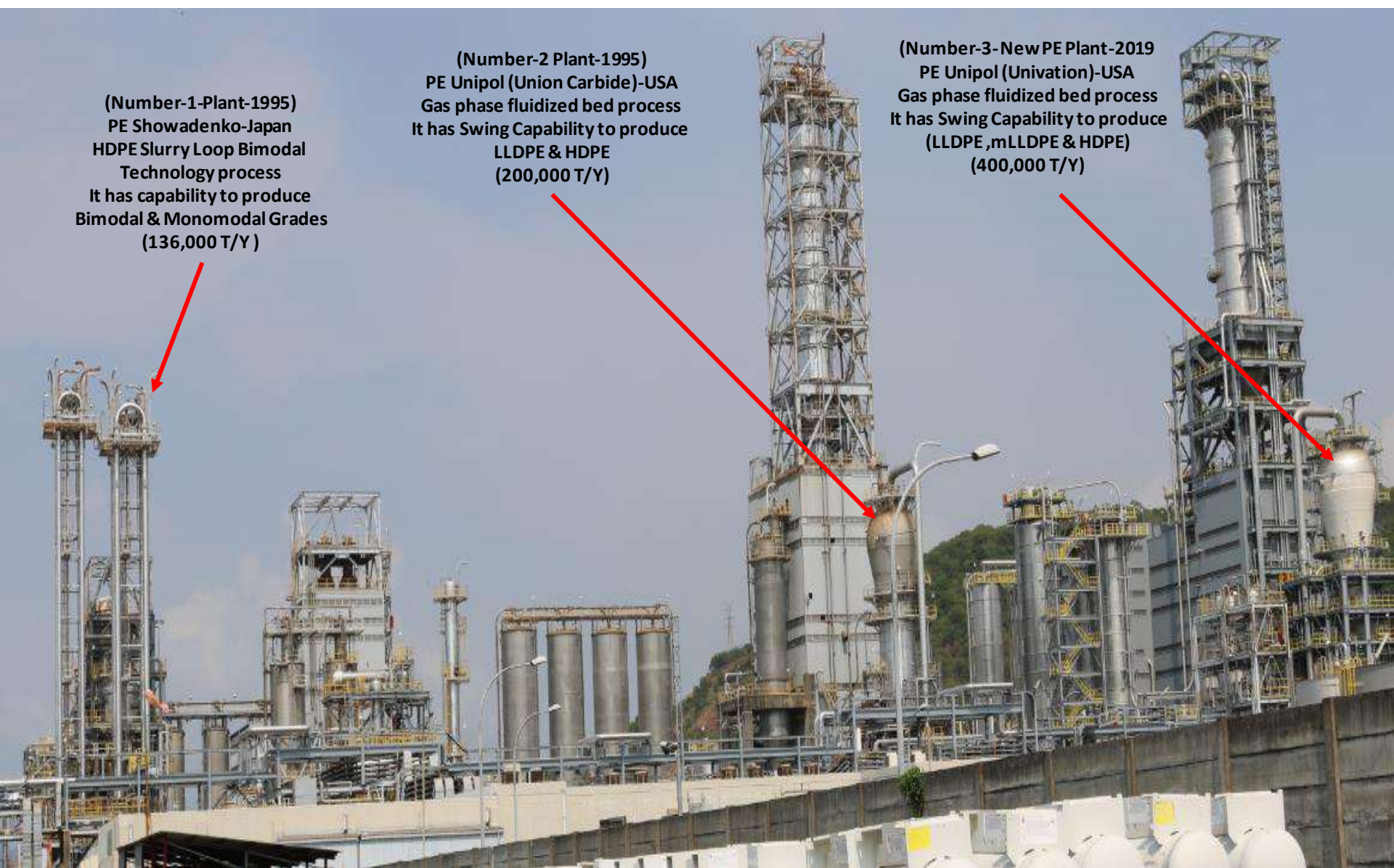
3 Trains – Polyethylene Plant

(With Overall Total Capacity = 736,000 Tons/Year)

(Number-1-Plant-1995)
PE Showadenko-Japan
HDPE Slurry Loop Bimodal
Technology process
It has capability to produce
Bimodal & Monomodal Grades
(136,000 T/Y)

(Number-2 Plant-1995)
PE Unipol (Union Carbide)-USA
Gas phase fluidized bed process
It has Swing Capability to produce
LLDPE & HDPE
(200,000 T/Y)

(Number-3-New PE Plant-2019)
PE Unipol (Univation)-USA
Gas phase fluidized bed process
It has Swing Capability to produce
(LLDPE ,mLLDPE & HDPE)
(400,000 T/Y)



Example Of Polyethylene Pellet (Biji Plastik)



Packaging Type Of Main Products (Polypropylene & Polyethylene)

PE-Bag



**Mainly Plastics Bags (25 kg/Bag)
(PE & PP)**

PP-Bag



**Jumbo Bags 600 kg
(PE & PP)**

Jumbo Bag



Bulk Container



**Bulk Container 17,500 kg
(PP)**

CAP-PE Commercial Brand Name (Asrene)

CAP-PP Commercial Brand Name (Trilene)

Polyethylene Warehouse 10 Times Soccer Fields

(Capable to store 55,000 Tons Products) with 53 Environment Friendly electric Fork Lift)



Friendly electric Forklift



Downstream Industry of Petrochemical (Converters)

PE-Asrene



PP-Trilene



Biji Plastic
PT. Chandra Asri

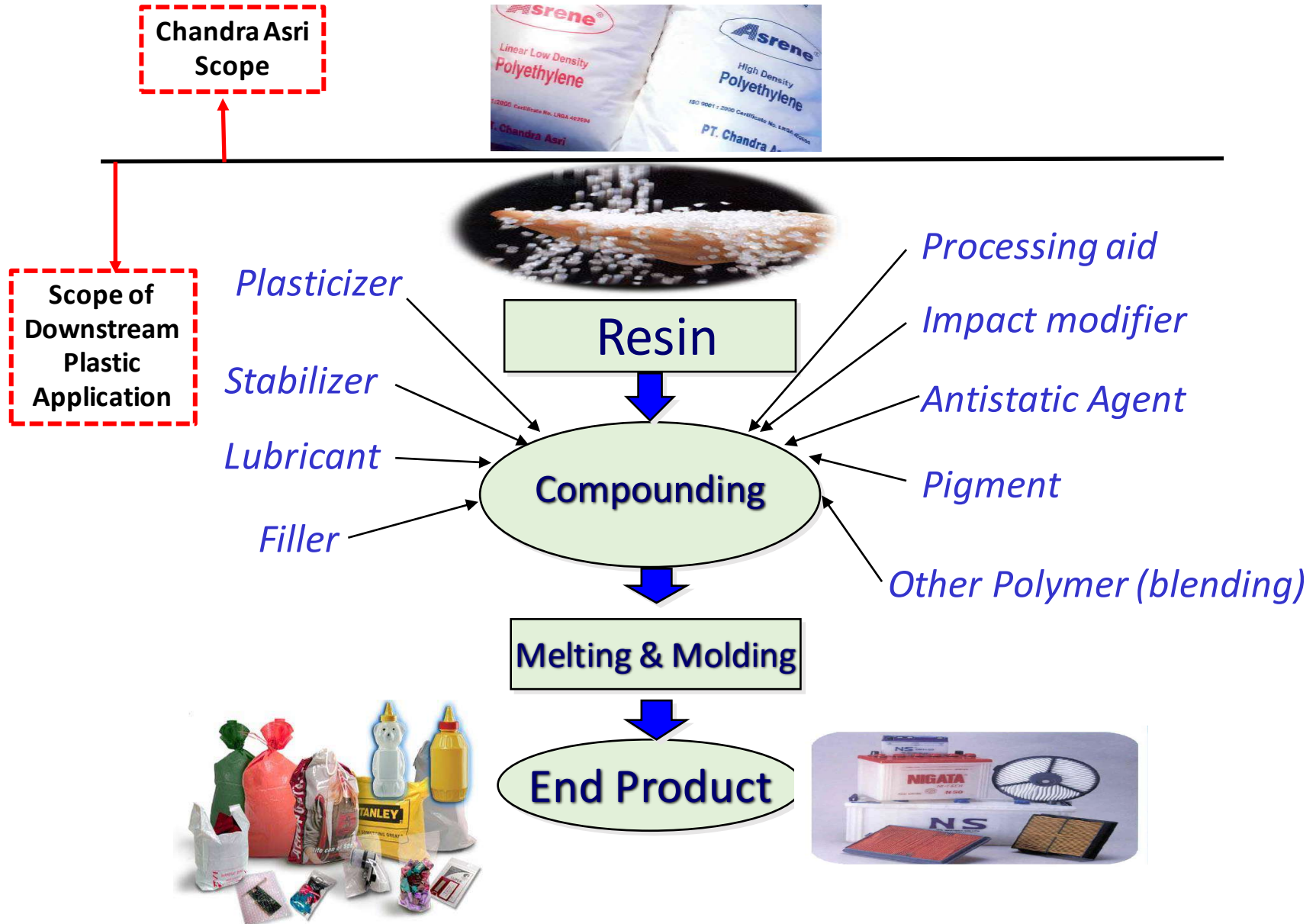


**Example Of Converter
downstream Of Petrochemical Industry)
(To Convert Polymer become end products)**

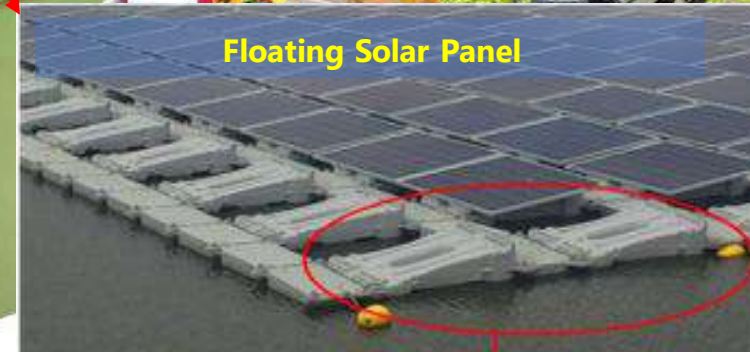


- | | |
|-------------------------------|--------------------|
| 1. Injection Molding Machines | : (Toys & Bottles) |
| 2. Blown Film Machines | : (Shopping Bag) |
| 3. Fiber Machine | : (Ropes/Sheet) |

Mechanism From Polymers Become Various End Products In The Customer machines



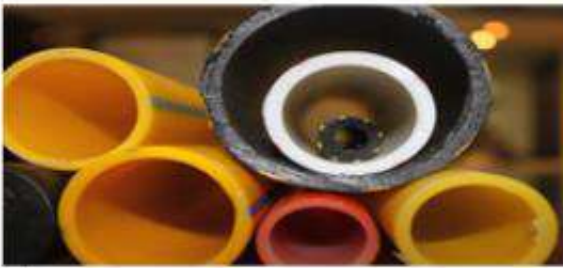
Berbagai macam Penggunaan Polyethylene



Three Types Typical Polyethylene

HDPE

High Density Polyethylene
Density "0.940 - 0.960"
Melt Index "0.05 - 100"
(Good Stiffness)



Melting Point
125-138 °C



Very few branches
支链很少

LLDPE

Linear Low Density Polyethylene
Density "0.910 - 0.930"
Melt Index "0.3 - 50.0"
(Good Flexibility & Good Clarity)



Melting Point
105-125 °C



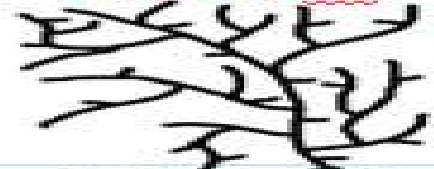
Many short branches

LDPE

Low Density Polyethylene
Density "0.900 - 0.935"
Melt Index "0.2 - 4,0"
(Very Good Flexibility & Very Good Clarity)



Melting Point
105-115 °C



Both long and short branches

Location-2
PT. Chandra Asri Petrochemical Tbk
3 Trains Polypropylene Plant (with Total Capacity 590,000 T/Y)
Licensed by Currently W.R. Grace & Co-USA
(Originally Licensed by Unipol Union Carbide-USA)

PP Debottlenecking
Increase capacity PP Plant
From 480 KTA To 590 KTA
All 3 Plants Completed Sep 2019 (TAM)
PP1=25 T/H X 8000 H/Y=200,000 T/Y (target)
PP2=25 T/H X 8000 H/Y=200,000 T/Y (Target)
PP3=22 T/H X 8000 H/Y=190,000 T/Y (Target)
Grand Tot Cap Increase= 590,000T/Y (Target)

200,000 T/Y
PP-Train-2
One reactor only

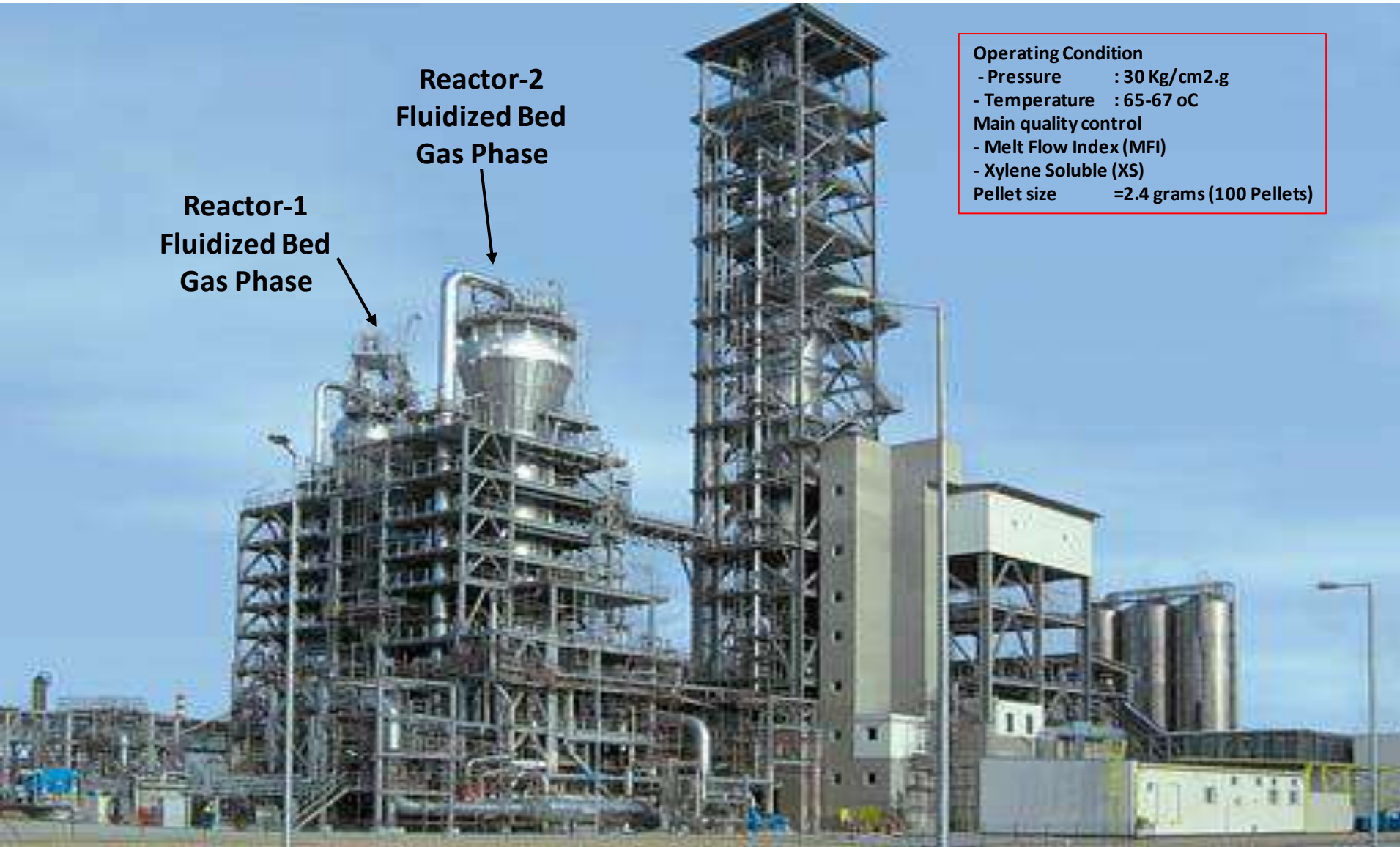
200,000 T/Y
PP-Train-1
One reactor only

190,000 T/Y
PP-Train-3
Two Reactors
In Series

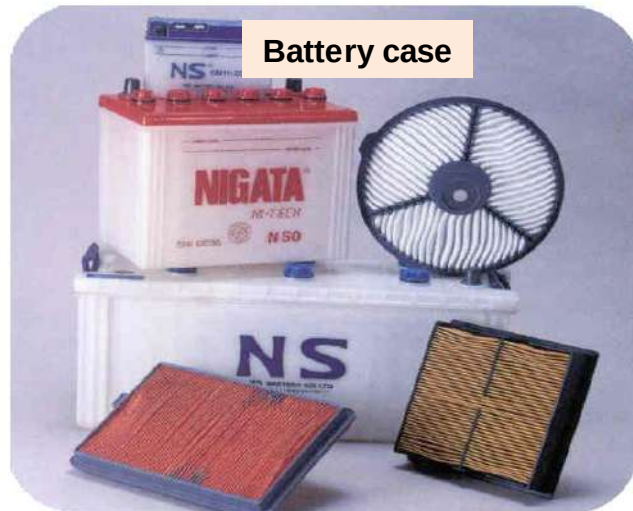


Train-3

Polypropylene Plant (Two Reactors In Series)



Block/Impact Polypropylene Application For Automotive Parts (Bumpers, Dashboard,etc)



PP Products for Medical Application

Medicalware

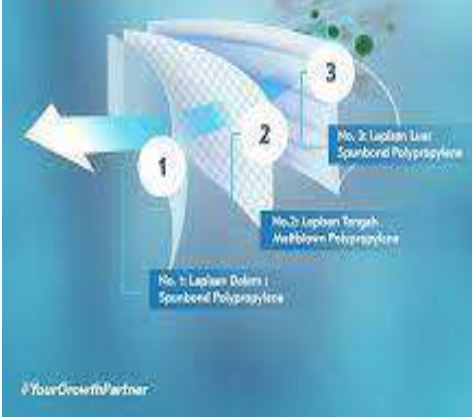


PROSES PENGEMBANGAN FLOCKED SWAB HS 19

PRODUKSI DALAM NEGERI



MENGENAL 3 LAPISAN MASKER BEDAH



Medical Packaging



Medical Strapping Tape



Medical Apparel



Laboratory Tubes

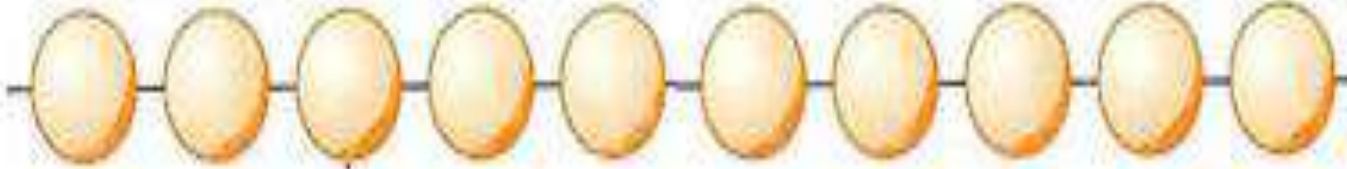


CAP-Polypropylene Production Capability

(For All 3 Basic Types of Polypropylene)

Homopolymer

(Rigid/Kaku & Glossy/Mengkilap (Glass aqua)
(No Ethylene Contents)



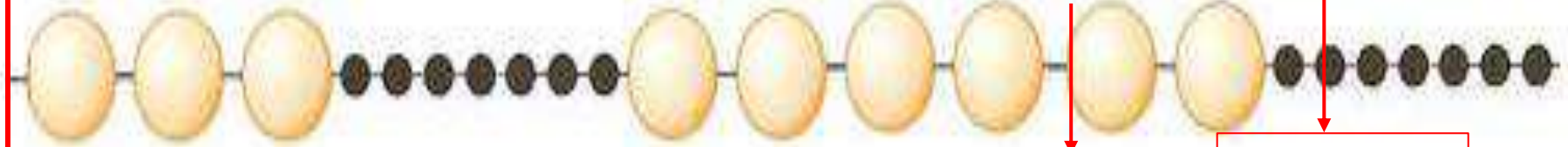
Random Copolymer

Clear/Jernih & Tough/Ulet (Tupper ware)
(Ethylene Content 4-7%)



Impact Copolymer

Rigid/Kaku, Strength/Kuat & Flexible (Bumper, Dashboard & etc)
Ethylene Contents (7-9%) or (Up to > 15%)



Low Rubber

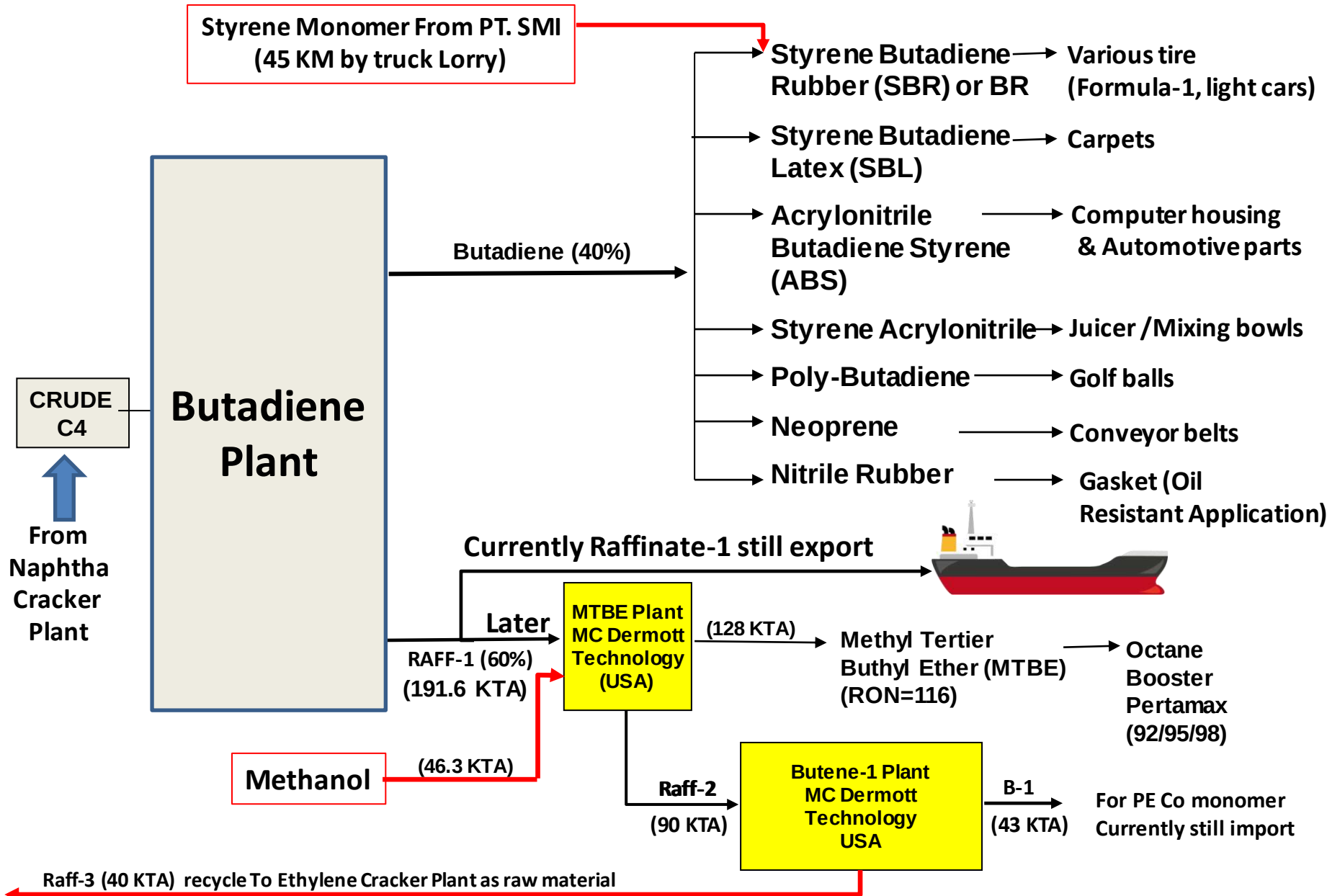
High Rubber

Butadiene Plant

(The Raw Material Raw C4 comes From Naphtha Cracker Plant)
(Start-up Q3-2013)



Butadiene & It's Application



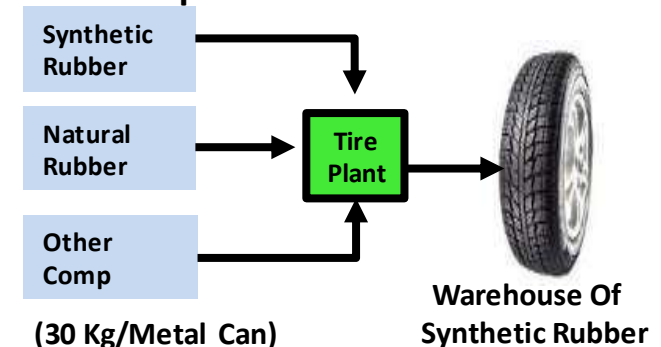
PT. Synthetic Rubber Indonesia

(Around 450 Million USD Investment & Commercial Operation- Q3-2018)



- Joint venture of Chandra Asri (PT. SMI) and Compagnie Financiere Groupe Michelin [45% CAP(SMI) and 55% Michelin]
- Ground Breaking done in November 2013
- Construction period around (3-4) Years
- Start up Third quarter of 2018 (Q3-2018)
- Currently already commercial Operation since Q3-2018
- Around 150 people hired and trained
- Original capacity 120,000 Of Synthetic Rubber
Which consists of [SSBR (80,000 Tons/Y) & NdBR (40,000 Tons/Y)]

SSBR : Solution Styrene Butadiene Rubber=3-BD/1-Styrene Monomer
NdBR : Neodymium Catalyst-Butadiene Rubber (PBR)= 1.05 BD/PBR



First MTBE and B1 Plants Geared to Meet Domestic Demand

Ministry of Industry: "We need to support the domestic petrochemical industry in Indonesia as it holds an important role to substitute import. In addition, petrochemical companies such as Chandra Asri also attracts new investors which will bring positive impact to the Indonesian economy"
– IDN Financials, 7 Sep 2020

Capacity

- MTBE (Methyl Tert-butyl Ether) plant capacity is 128KTA, tapping into octane booster market that is still reliant to import.
- B1 (Butene 1) plant capacity is 43KTA, where 33KTA will be absorbed by Chandra Asri's own operation while the rest is targeted for domestic market.

Technology

- Both plants are using Lummus Technology, one of the most advanced petrochemical processing technology in the world.

Values

- Capturing added value along integrated production chain especially Raffinate-1 which produced from our Butadiene plant process.



Ethylene send to Location-3 (Bojo Negara) 45 KM away as raw material for 2 Trains Styrene Monomer Plants

Commercial Operation	
SM-1	Dec 1992
EB-1	Dec 1995
EB-2 & SM-2	Jul 1999
Revamp SM-2	Jun 2002
Acquired by CAP	Apr 2007
Supply C2-F-CAP	Apr 2008
Use NG-Burner	Apr 2008

From CAP
Location 1
45 Km away
By pipe line

(100 KTA)

(240 KTA)

Benzene
Still
Import

SM Plant Train-2

Ethylene

Benzene

EB-2
Lummus

EB

SM-2
Lummus

SM Plant Train-1

SM-1
Lummus

EB-1
Badger-Mobil

340 KTA (Total)

SM

As Raw Materials Of
Various Products

8.6 KTA (Total)

Toluene

As a Solvent of
(Paints, Inks & etc)

Styrene Monomer

Application

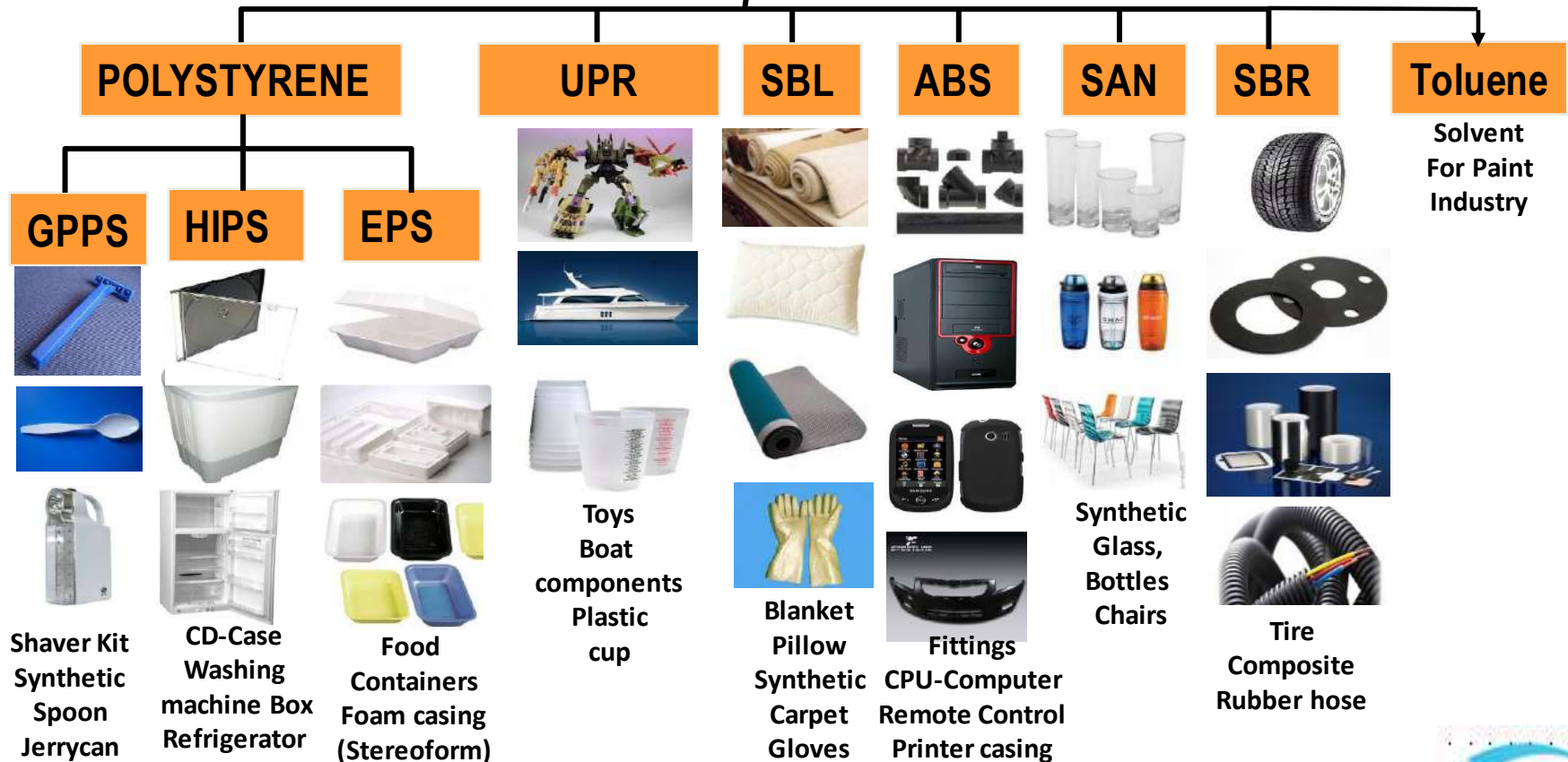
Domestic Customer

UPR	: Eternal, Eterindo, Justus
SBL	: BASF (Jakarta & Merak)
SBR	: SRI & Gadjah Tunggal
EPS	: Kofuku
PS	: Trinseo PS
Latex	: Trinseo Latex

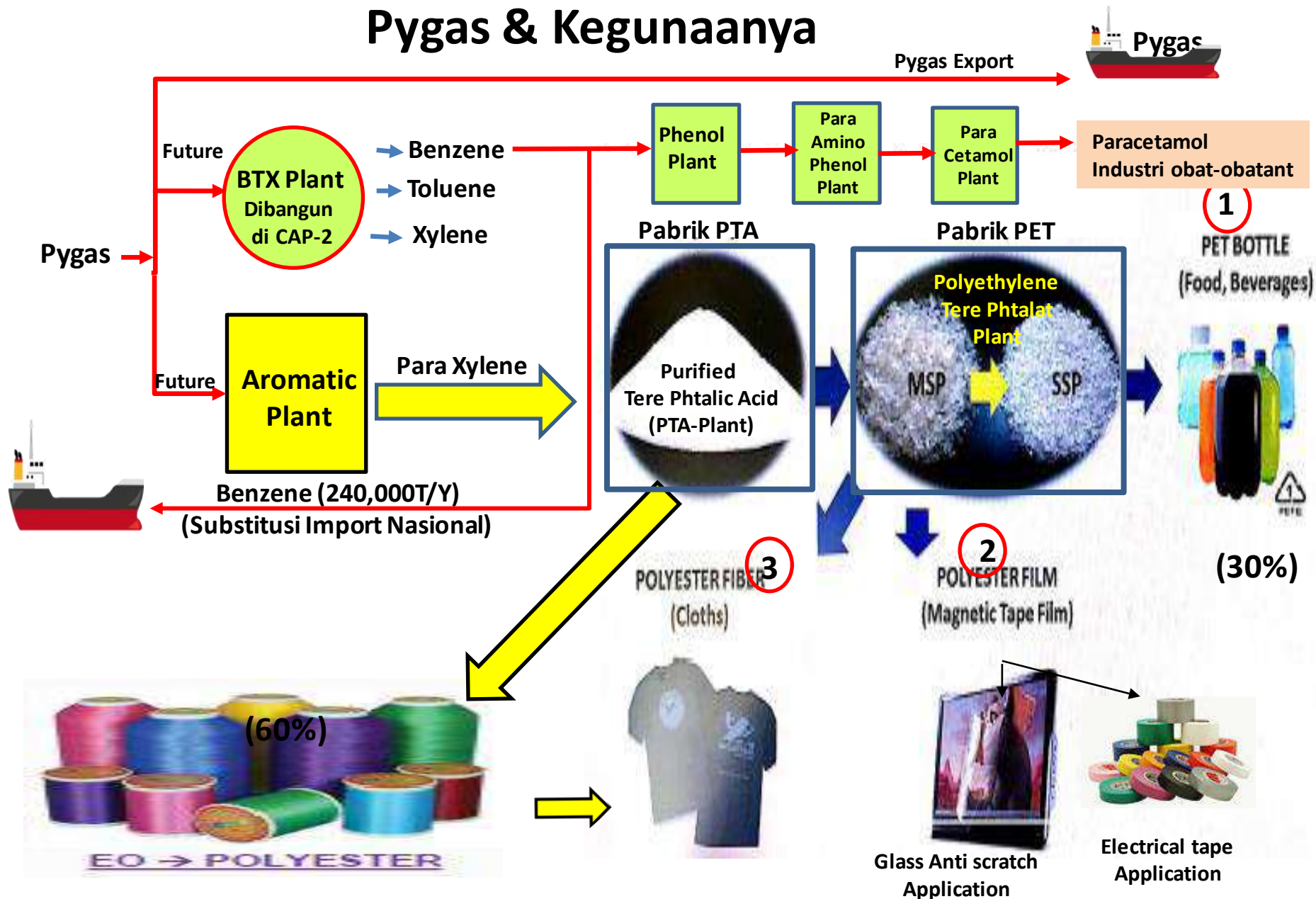


Styrene Monomer As Raw Materials Of Various Products

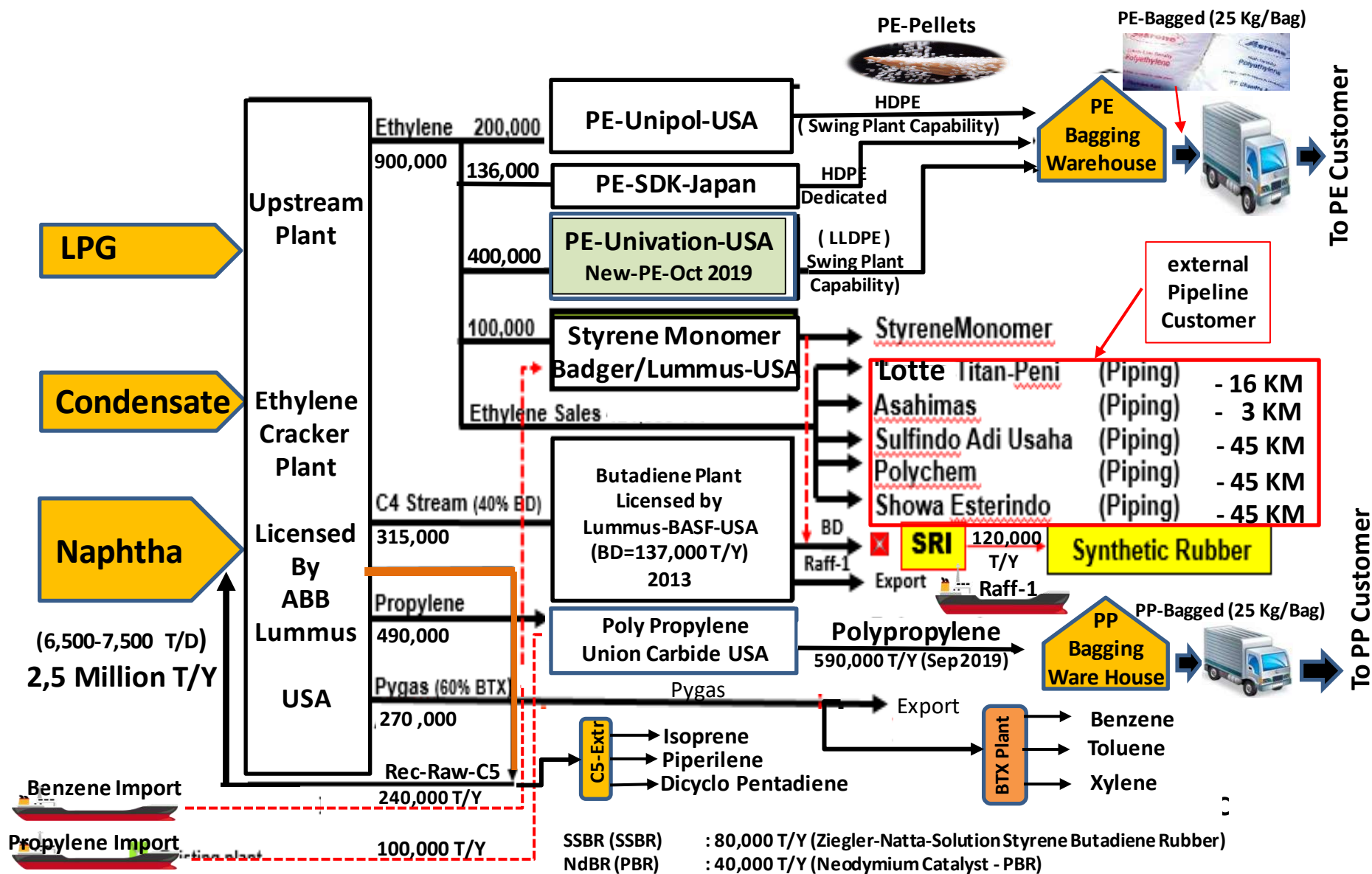
GPPS	: General purpose Polystyrene
HIPS	: High Impact Polystyrene
EPS	: Expandable Polystyrene
UPR	: Unsaturated Polyester resin
SBL	: Styrene Butadiene Latex
ABS	: Acrylonitrile Butadiene Styrene
SAN	: Styrene Acrylonitrile Resin
SBR	: Styrene Butadiene Rubber



Pygas & Kegunaanya

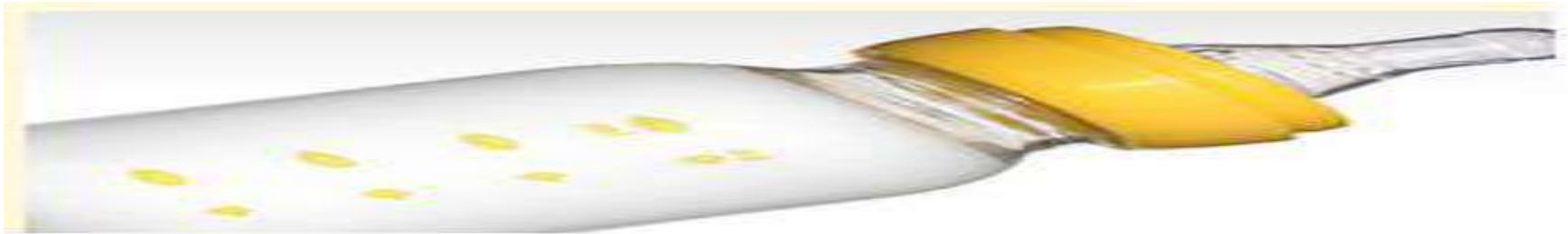


Overall Potential Downstream Development PT. Chandra Asri Petrochemical Tbk.



Application For Raw C5

Isoprene (C_5H_8) Application (Baby milk rubber)



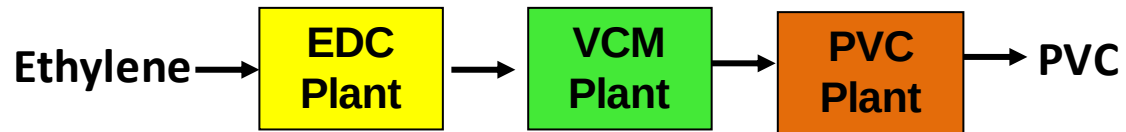
Piperilene (C_5H_8) Application (marking road)



Dicyclo Pentadiene ($C_{10}H_{12}$) Application (Lens Frame)



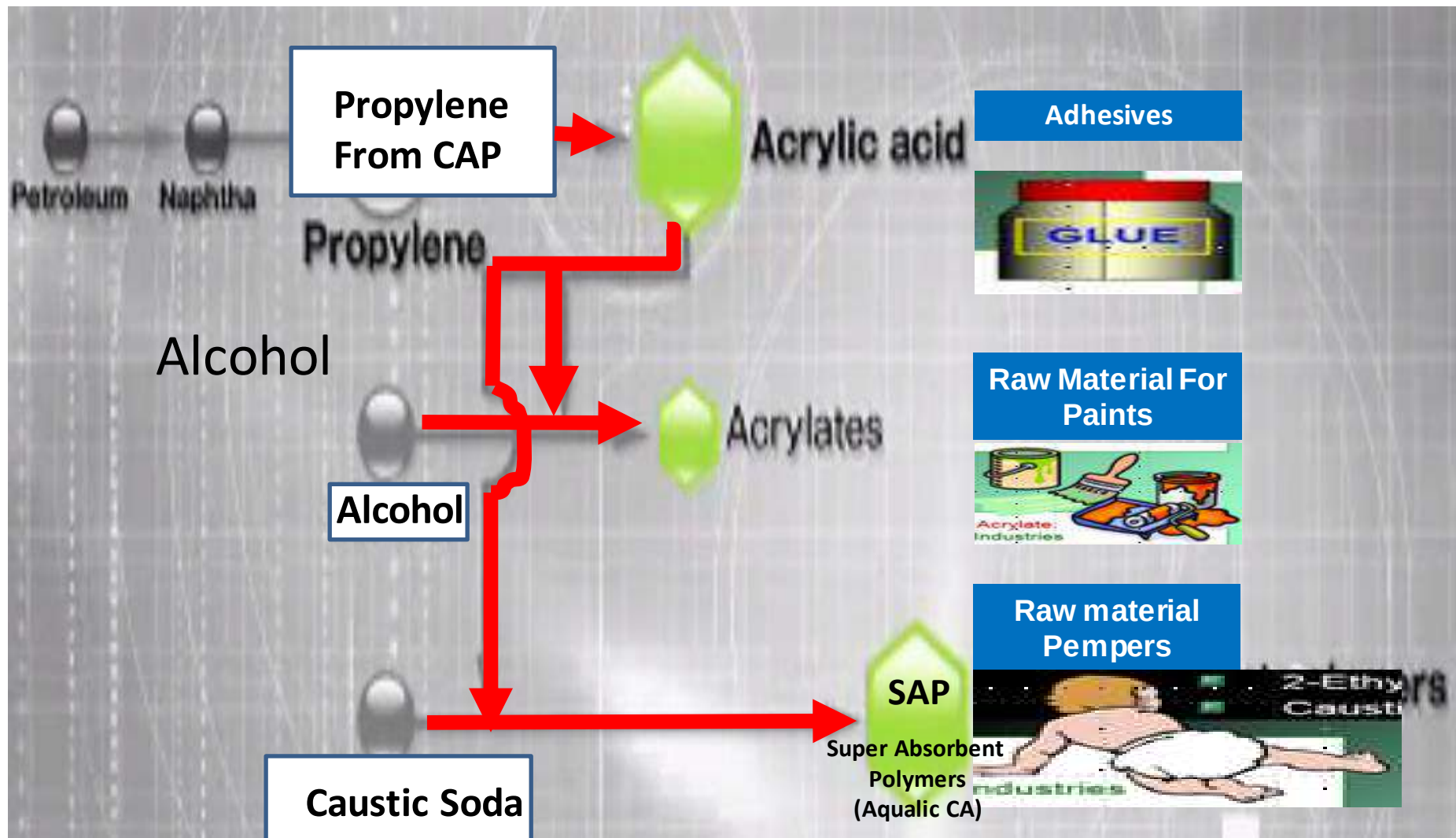
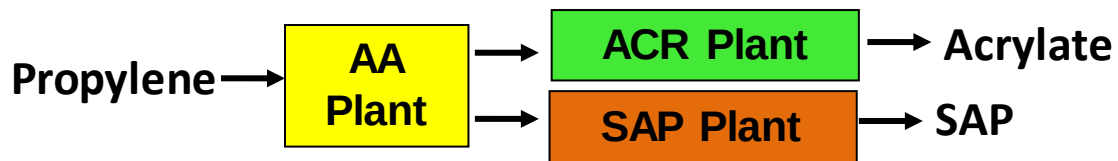
Ethylene sell to Asahimas Company

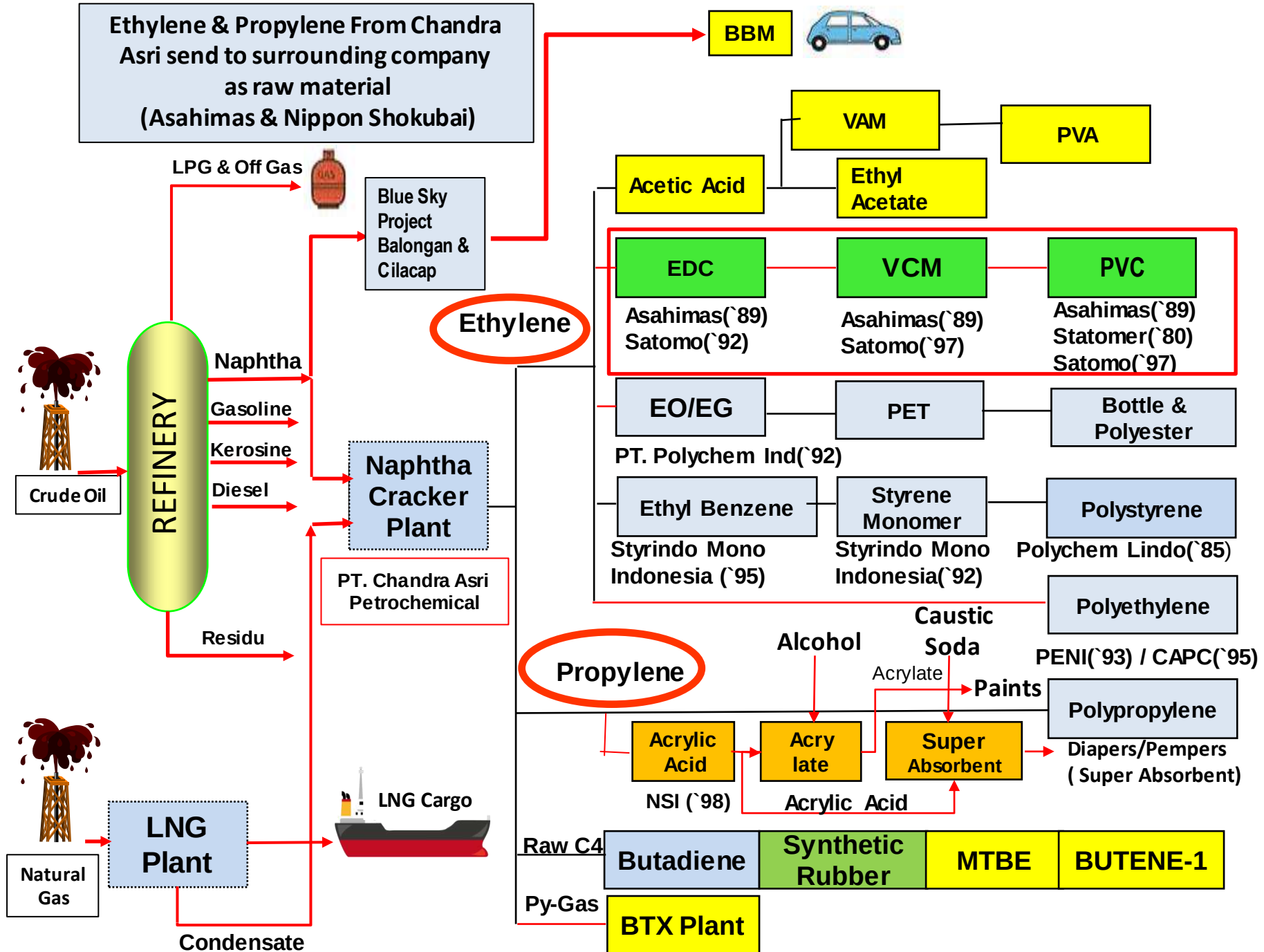


Push Button PASC-Plant
(Japan)

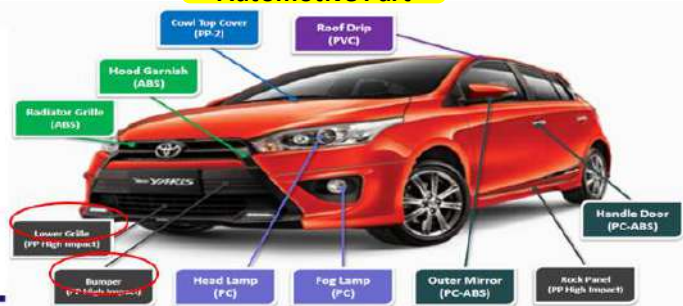


Propylene sell to Nippon Shokubai Company





Bumper Automotive Part



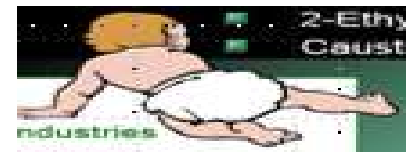
Various Products come from Petrochemical Industry which are utilized In Our Daily Life)



Masker



Household Appliances



Medical Purposes



Refrigerator

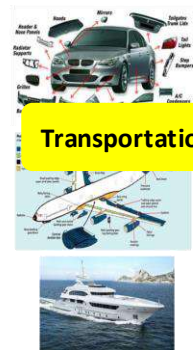


Stereo form



Tupper ware

Transportasi



Transportation



Electronics



Agriculture



Synthetic leather



Frame window



Garment & Clothing



Bottle, Toys & Packaging



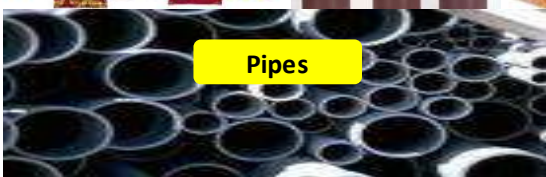
Pharmacy's Bottle



Multi layer Packaging



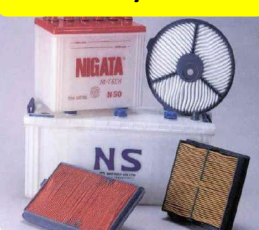
Pipes



Car Dashboard



Battery-Case



CPU-Computer



**DCS Central Control Room Polypropylene Plant
upgraded from TDC 3000 Yamatake-Honeywell to Newest Generation experion R430.1 Honeywell
Capital Intensive Industry**



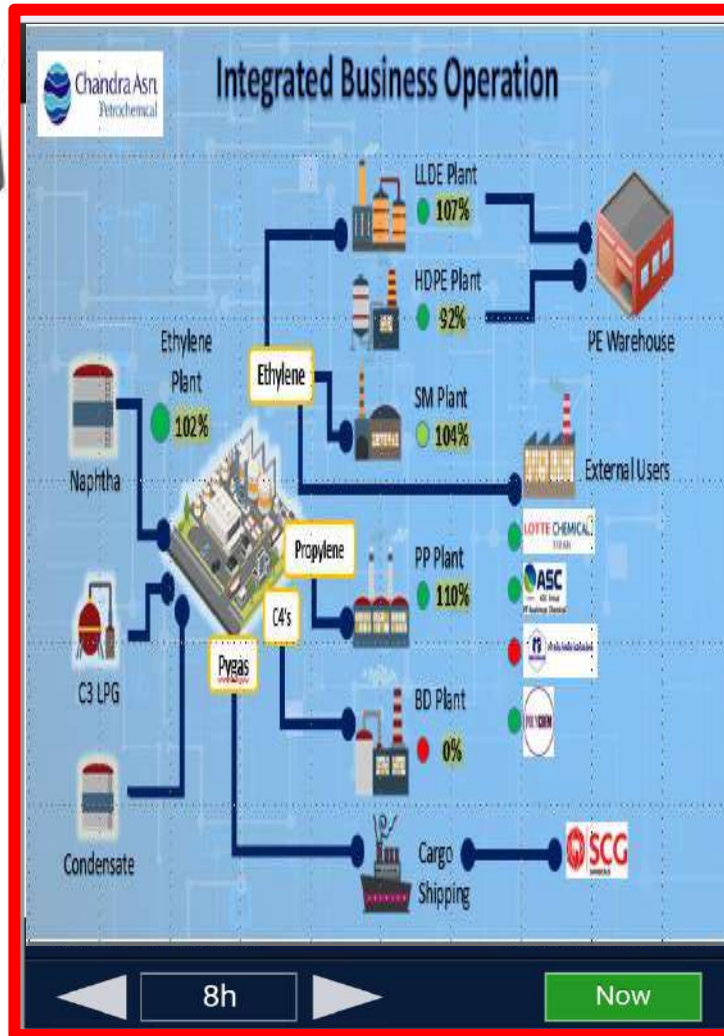
Real Time Monitoring Mobile Tool

(Through Application PI Corseight)

*"Seeing plant data on any device,
wherever we are, whenever we need it"*



Mobile
Phone



Plant Information System



Ethylene, Utility, OM



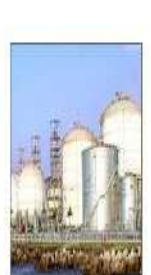
LLDPE



HDPE



Butadiene



Poly Propylene



8h



Now

Company

(Vision, Mission, Commitment & Value)



Vision

Indonesia's leading
And preferred
Petrochemical
Company.



Mission

Continue to grow and
improve our leadership
Position Through
integration, development
of human capital and
preferred Partnership In
a sustainable manner,
that will contribute
To the growth of Indonesia

OUR COMMITMENT

Is to grow our business on the triple bottom line

PEOPLE



- ▶ We choose the best and brightest human resources
- ▶ We prioritize honesty, integrity and justice to all stakeholders.
- ▶ We treat people with respect.
- ▶ We give opportunities to learn, develop and grow.

PLANET

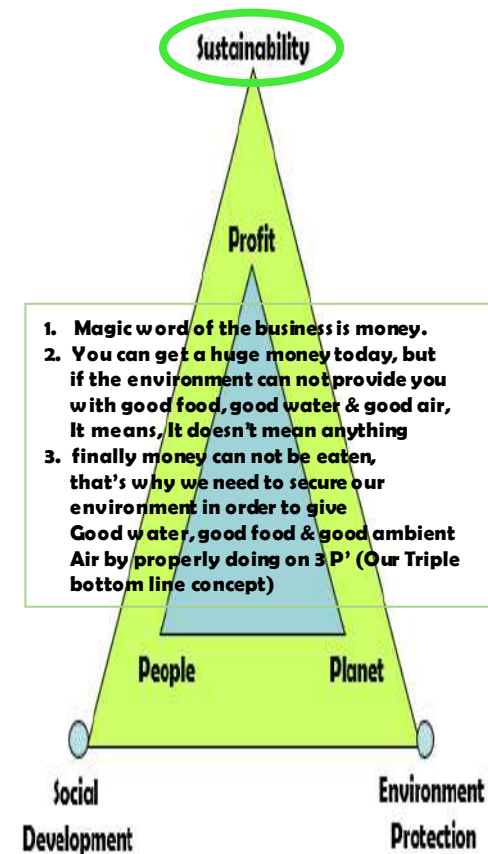


- ▶ We adopt the circular economy.
- ▶ We are moving towards the sustainable development goals.
- ▶ We nurture communities, enriching lives.
- ▶ We respect laws, rules, procedures and regulations within the country and society.

PROFIT

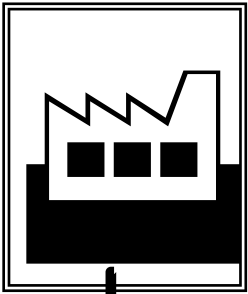


- ▶ We do our best to protect shareholders' investment and provide an acceptable rate of return.
- ▶ We aim for solutions, not transactions.
- ▶ We provide customers-oriented services.
- ▶ We are responsive to global market trends.



Chandra Asri Environmental Management System

Warehouse & Tanks



Stacks Boilers



Stack Furnaces

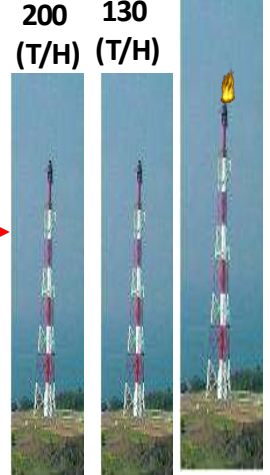


Enclosed Ground Flare (EGF) (220 T/H)



Flare Stack

200 (T/H) 130 (T/H) 1,100 (T/H)



Fugitive Emission
New PE Old PE OBD Mon

Main / by (Products)

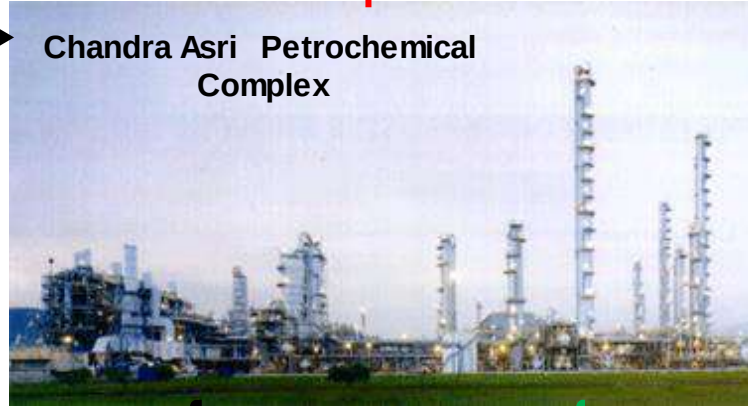
Waste water treatment



RCAC/Energy

Gaseous waste

Chandra Asri Petrochemical Complex



Liquid Waste

Solid Waste

Incinerator



TWHA



TWHA
RCAC

: Temporary Waste Handling Area
: Raw material, Catalysts, Additives & Chemicals

- Noise Pollution (Suara)
- Luminous Pollution (nyala)
- Non Smokeless Flaring Operation (Due to complete combustion & Enclosed)
- 14 Million USD (Investment) (Rp 210 Milyar)
- Callidus TEGF-UOP-Technology

Chandra Asri Environmental Monitoring System

Emission gas Monitoring



Ambient Air Monitoring



Sea Water Monitoring



Waste Water monitoring

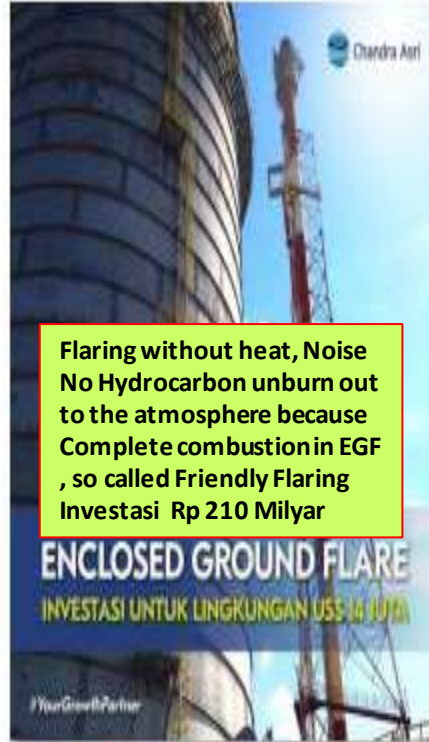


Investasi Dalam Mendukung Keberlanjutan



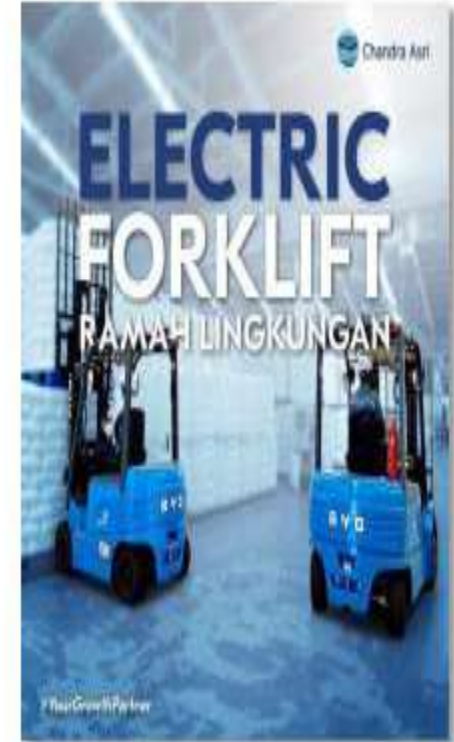
Solar Panel
Area wide (6,530 M2)
Generate Power (1,153 KWp)
Reducing CO2=0.87 T-CO2eq/MW

Chandra Asri, bekerja sama dengan Total Solar, mulai menggunakan **solar energy** pada area laboratorium, gudang, dan perkantoran di dalam Pabrik kami.



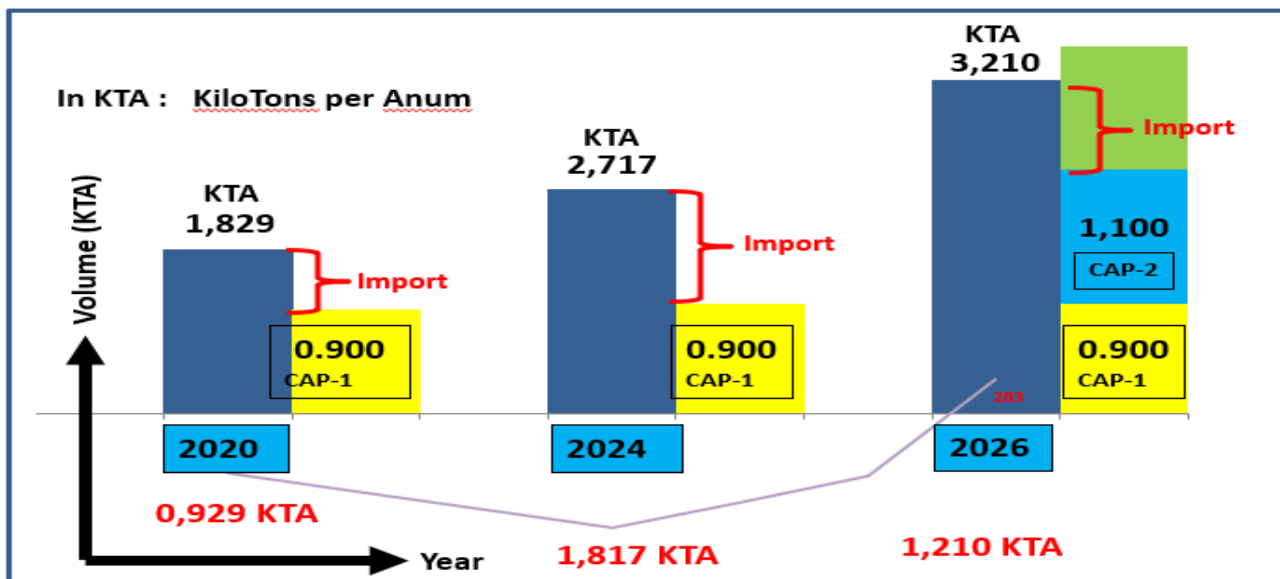
Enclosed Ground Flaring (EGF) dapat membakar **220 ton hidrokarbon per jam** yang beroperasi saat pabrik mulai beroperasi dan jika terjadi kondisi di luar operasi biasa.

Electric ForkLift (Not Fossil Fuel Totally = 53 Forklift
- PE Warehouse = 31 Unit
- PP Warehouse = 22 Unit



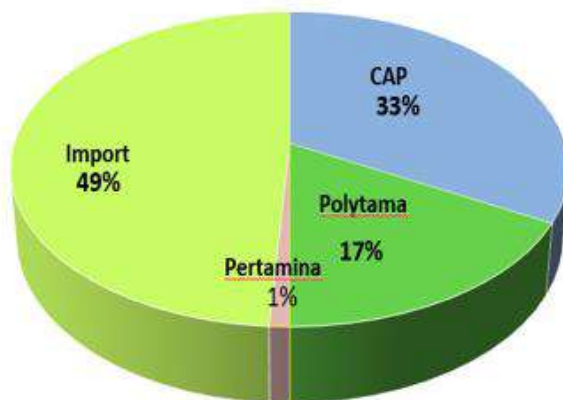
Chandra Asri berkomitmen untuk mengatasi perubahan iklim dengan mengoperasikan **53 unit forklift elektrik** sejak 2020.

2. Supply & Demand Major Products Petrochemicals In Indonesia



DOMESTIC SUPPLY & DEMAND BALANCE
(POLYPROPYLENE)

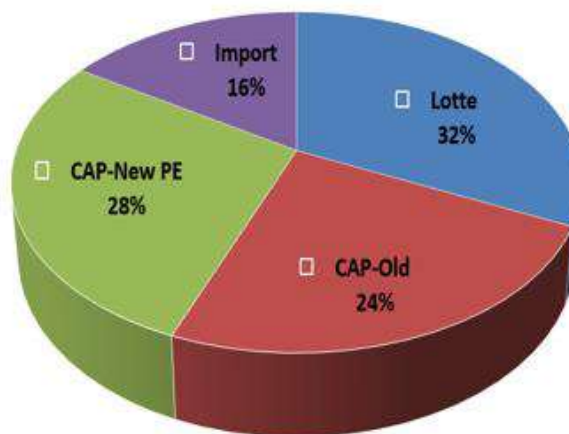
(With Total Demand 2020 around 1,8 Million Tons Per Year)



■ CAP ■ Polytama ■ Pertamina ■ Import

DOMESTIC POLYETHYLENE SUPPLY & DEMAND BALANCE

(With Total Demand 2020 around 1,7 Million Tons Per Year)



■ Lotte ■ CAP-Old ■ CAP-New PE ■ Import

IMPOR KOMODITAS
PETROKIMIA 2020 TOTAL
7,32 JUTA TON SENILAI
US\$ 7,13 MILIAR

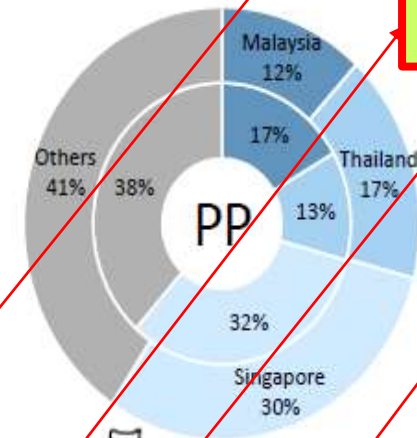
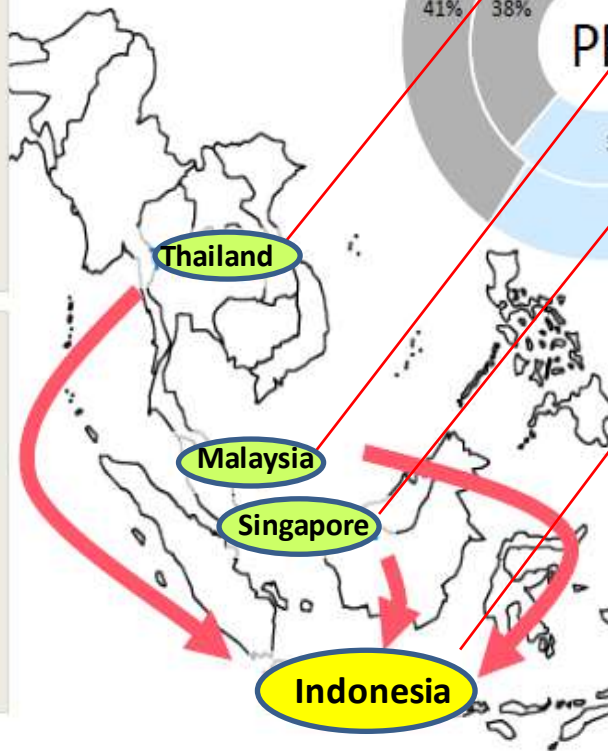
Produk	Volume (Juta Ton)	Nilai (Miliar US\$)
Petrokimia Hulu	2,92	1,6
Petrokimia Intermediate	0,71	0,54
Petrokimia Hilir	3,69	4,99
Total	7,32	7,13

Produk	Volume (Juta Ton)	Nilai (Miliar US\$)
Hulu Olefin	0,99	0,76
Hulu Aromatik	1,08	0,62
Hulu C1	0,84	0,21
Petrokimia Intermediate	0,71	0,54
Bahan Baku Plastik & Serat Sintetis	2,35	2,63
Resin Sintetis	1,01	1,82
Karet Sintetis	0,31	0,54
Total	7,32	7,13

7,13 Billion USD

3. Perbandingan Upstream Petrochemical Industry Di Negara ASEAN (Ethylene Cracker Plants)

Indonesia relies on ASEAN imports for a majority of its polyolefins demand

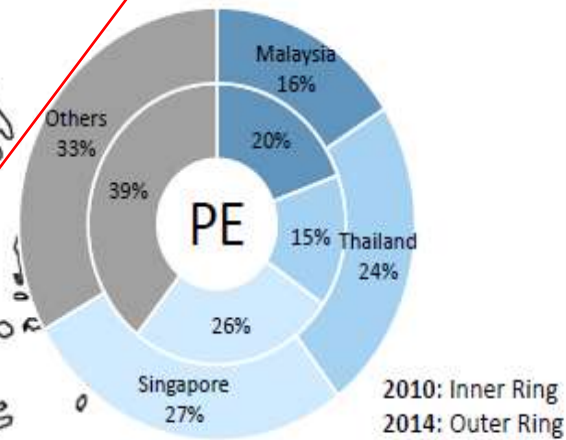


7 Cracker Plants
(70 Million Population)

5 Cracker Plants
(25 Million Population)

4 Cracker Plants
(6 Million Population)

1 Cracker Plants
(270 Million Population)



2010: Inner Ring
2014: Outer Ring

www.icis.com 36

Jurong Island

As an example Integration Refinery & Petrochemical

SINGAPORE

SUPPLEMENT PRESENTED WITH ACN, CMK AND ECN

OCTOBER 2002

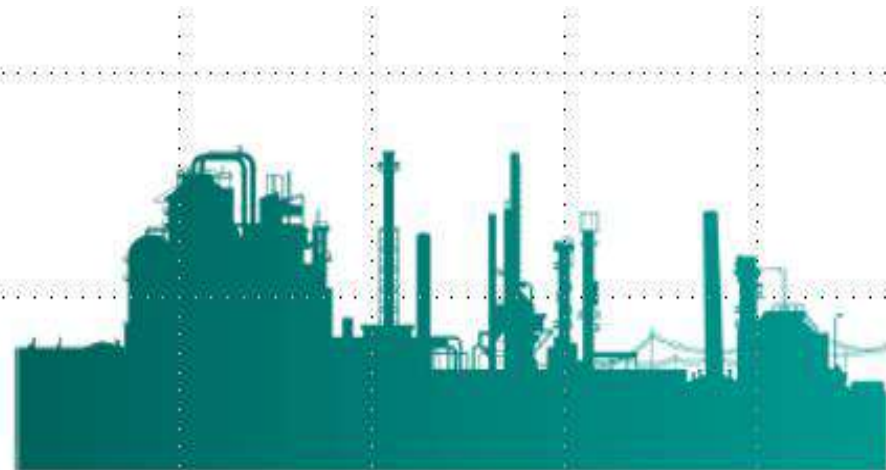


SPONSORED BY



Shell Chemicals

Why Pengerang? Strategic location at the south-east tip of Peninsular Malaysia...



Refinery and Petrochemical Integrated Development (RAPID) project, Pengerang

FID in April 2014, expected refinery start-up by 2019



versalis

USD 27 billion
Capital expenditure

300,000 bpd
Production of petroleum products

7.7 million tpa
Production of ethylene, propylene, C4 and C5 olefins and differentiated and specialty chemicals

Strategic Location

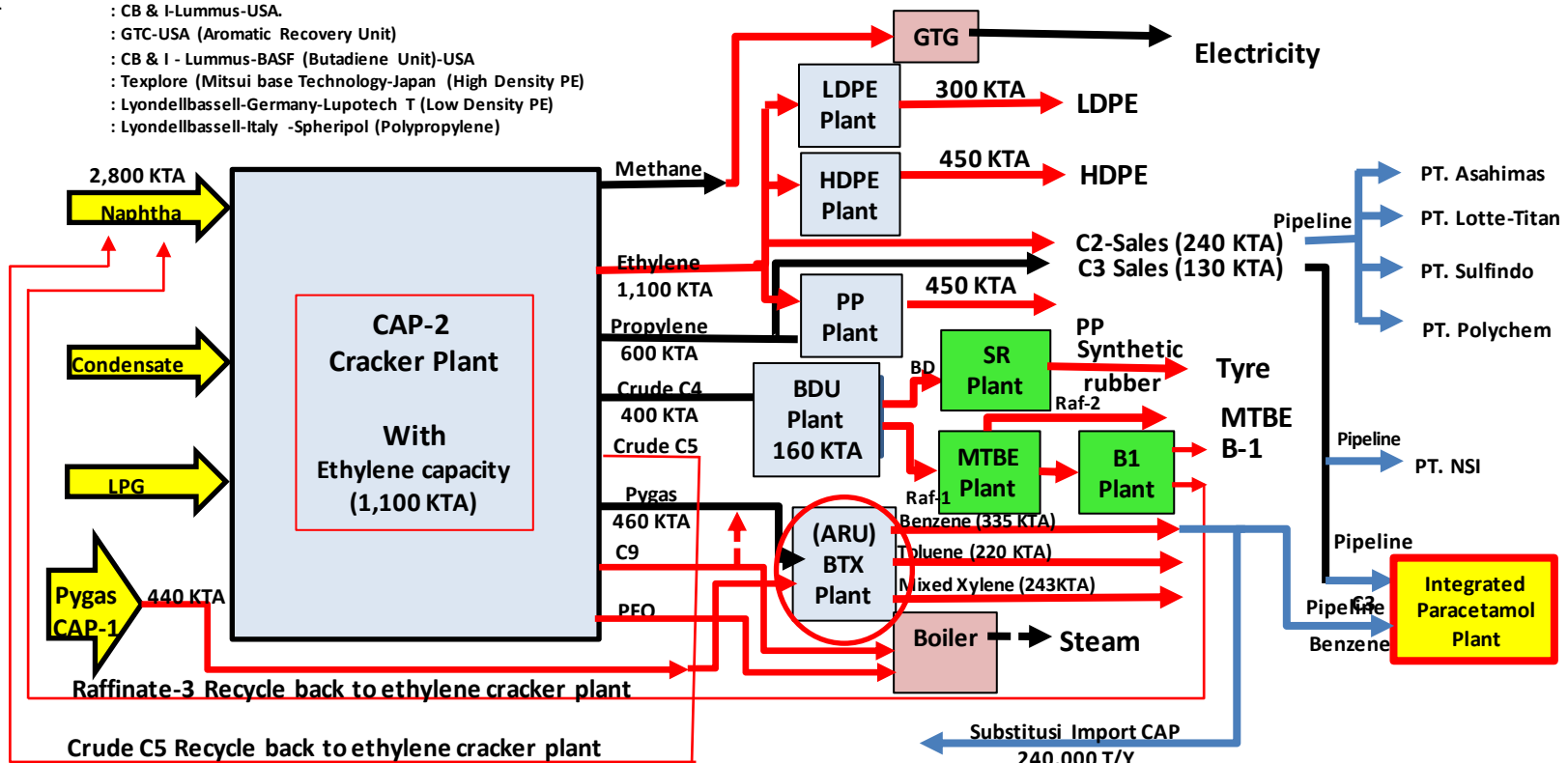
- Access to existing major **international shipping lanes**.
Middle East - Singapore - China
- Proximity to an existing major trading hub;
Adjacent to Singapore
- **Deep water of -24m** enables VLCCs and ULCCs
- **Very few Environmentally Sensitive Areas (ESAs)** which are easily preserved
- Low negative socioeconomic impact
- **Relatively unpopulated** leading to minimal population relocation
- **Safe and sheltered harbour**
- No breakwater required with sufficient seagoing passage for VLCCs and ULCCs
- Availability of sufficient development land
- **A single candidate plot in excess of 20,000 acres**

CAP-2 Brand New Integrated Petrochemical Plant (5 Billion USD Investment) dengan substitusi impor sebesar 2,9 Billion USD Per Tahun)



Selected Technology for CAP-2

1. Cracker : CB & I-Lummus-USA.
2. ARU : GTC-USA (Aromatic Recovery Unit)
3. BDU : CB & I - Lummus-BASF (Butadiene Unit)-USA
4. HDPE : Texplore (Mitsui base Technology-Japan (High Density PE)
5. LDPE : Lyondellbassell-Germany-Lupotech T (Low Density PE)
6. PP : Lyondellbassell-Italy -Spheripol (Polypropylene)



Brand New Integrated Petrochemical Complex

Relationship

(Core Process Plants - Utilities & Other Facilities)

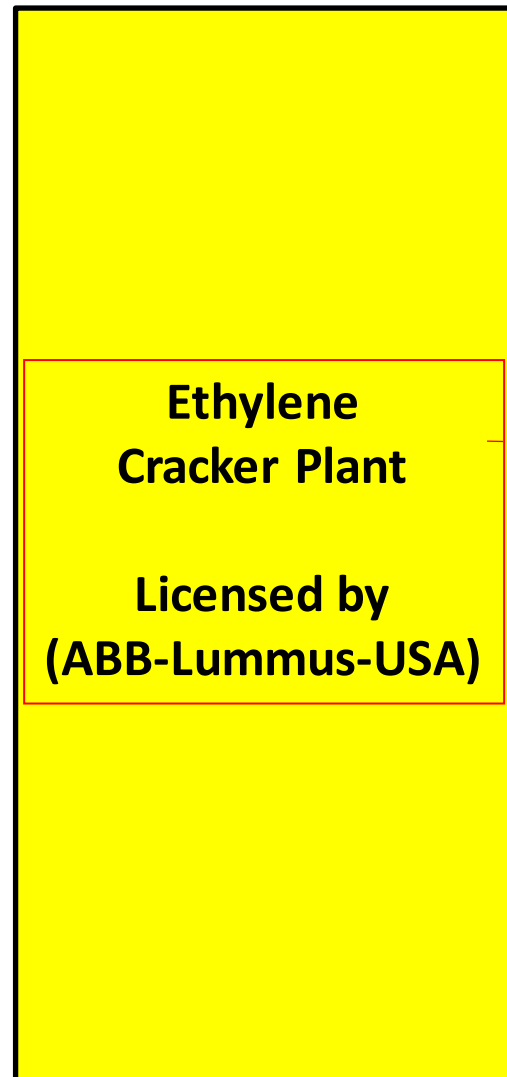


Infra structure
 Land
 Tank farms
 Jetty & loading F
 Warehouse
 Laboratory
 Control Room
 Buildings
 Parking area
 Road
 Lighting
 Road
 Drainage
 Emergency Centered

Naphtha ↔

Condensate ↔

LPG ↔



→ Ethylene (Main products)
 → Propylene (Main products)
 → Crude C4
 → Pygas
 → C9
 → PFO
 → H2
 → Methane

PFO-Sales

TEG (400 oC)

RCAC

PE/PP Plants

Electricity

Steam

CW-

Main

PA/IA

TW

N2

Utilities &
 Other Support
 facilities

GTG

Desalination
 (DST)

Boiler

Electricity

Steam

CW-AFP

SW-AFP

PA/IA

TW

N2

LDPE
 Plant

LDPE
 Products

HDPE
 Plant

HDPE
 Products

PP
 Plant

PP
 Products

BDU
 Plant

Butadiene
 Raffinate-1

BTX
 Plant

Benzene
 Toluene
 Mixed
 Xylene

1. Chemicals
2. Treated Water (TW)
3. Natural Gas (NG)
4. Nitrogen (N2)
5. Electricity (PLN)

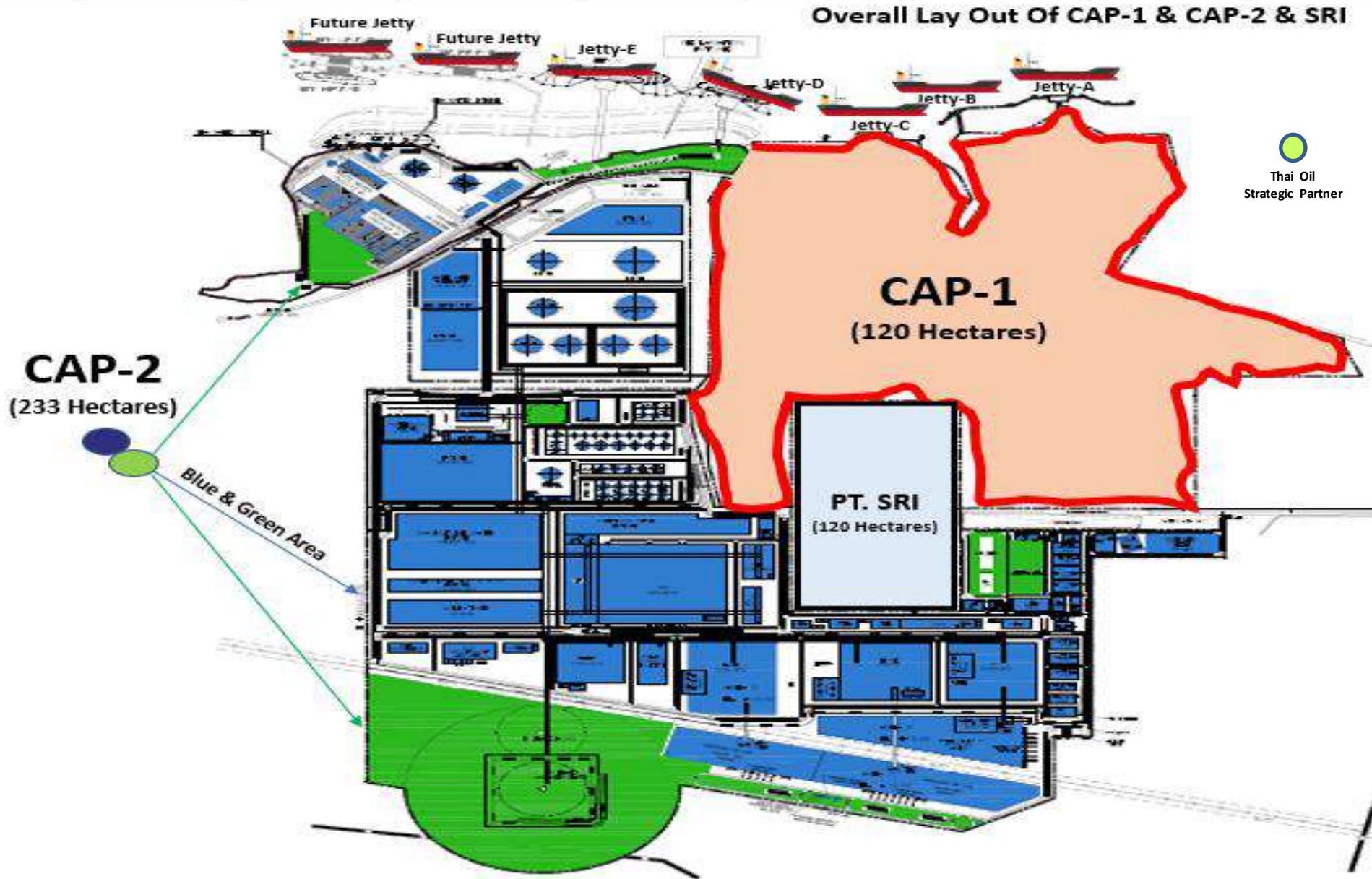
CW Power

Note
 GTG : Gas Turbine Generator
 CW : Cooling Water
 PA/IA : Plant Air / Instrument Air
 TW : Treated Water
 N2 : Nitrogen
 LDPE : Low Density Polyethylene
 HDPE : High Density Polyethylene
 PP : Polypropylene
 BDU : Butadiene Unit
 BTX : Benzene Toluene Xylene
 LPG : Liquefied Petroleum Gases

8. Lay Out CAP-2



Overall Future CAP-2 Plant Lay Out



Potential Economic Benefit

Around 2,9 Billion USD per Year of Product Domestic Bruto (PDB)

CONFIDENTIAL

Potensi Manfaat Ekonomi Terhadap Perekonomian (PDB)



Produk	Harga USD/Ton (moving average 2013 – 2019)	Estimasi Hasil Produksi Kena PPN(KTA)*	Output Langsung dalam USD
LDPE	1.321	300	396,3 juta
HDPE	1.292	450	581,4 juta
Etilena	1.141	190	216,8 juta
Polipropilena	1.705	450	767,2 juta
Propilena	902	115	103,8 juta
Butadiena	1.120	159	178,0 juta
Benzena	763	335	255,7 juta
Toluena	848	220	186,6 juta
Xilena	884	243	214,8 juta
TOTAL			2,9 miliar

Sumber: DDTIC Fiscal Research, diolah

*Asumsi produksi 100% kapasitas

Investasi PT CAP2 berpotensi menghasilkan **output langsung sebesar USD2,90 miliar** atau setara dengan **Rp41,04 triliun per tahun** atau **sekitar 821 Triliun Rupiah** (asumsi lifetime 20 tahun) terhadap ekonomi Indonesia

CAP-2 Project Information

1. Project Name : CAP-2 Project
2. Type Of Project : Green Field
3. Estimated Investment : 5 Billion USD
4. Project purpose : Import Substitution
(Foreign Exchange Saving)
5. Estimated Man power during Construction : Up 25,000/Day at Peak
6. Estimated Man Power during Normal Operation : Up to 2,000
7. Total Area : 233 Hectares
8. Location : Jl Raya Anyer KM 123
Ciwandan, Cilegon, Banten
Indonesia
9. Create Job Opportunity : 215,000 People
10. Create local economic development & Trickle down effects from around 5 Billion USD Investment (During Project phase & during Normal operation), so called
 1. Direct effect
 2. Indirect effect
 3. Side effect (see next slide)



Video
NPE Construction
Progress Nov 2018



Video
Impact NPE terhadap
Ekonomi (peresmian NPE)



Video
Rapid Project
Malaysia



Video
MTBE & B1 Construction
Progress Nov 2018



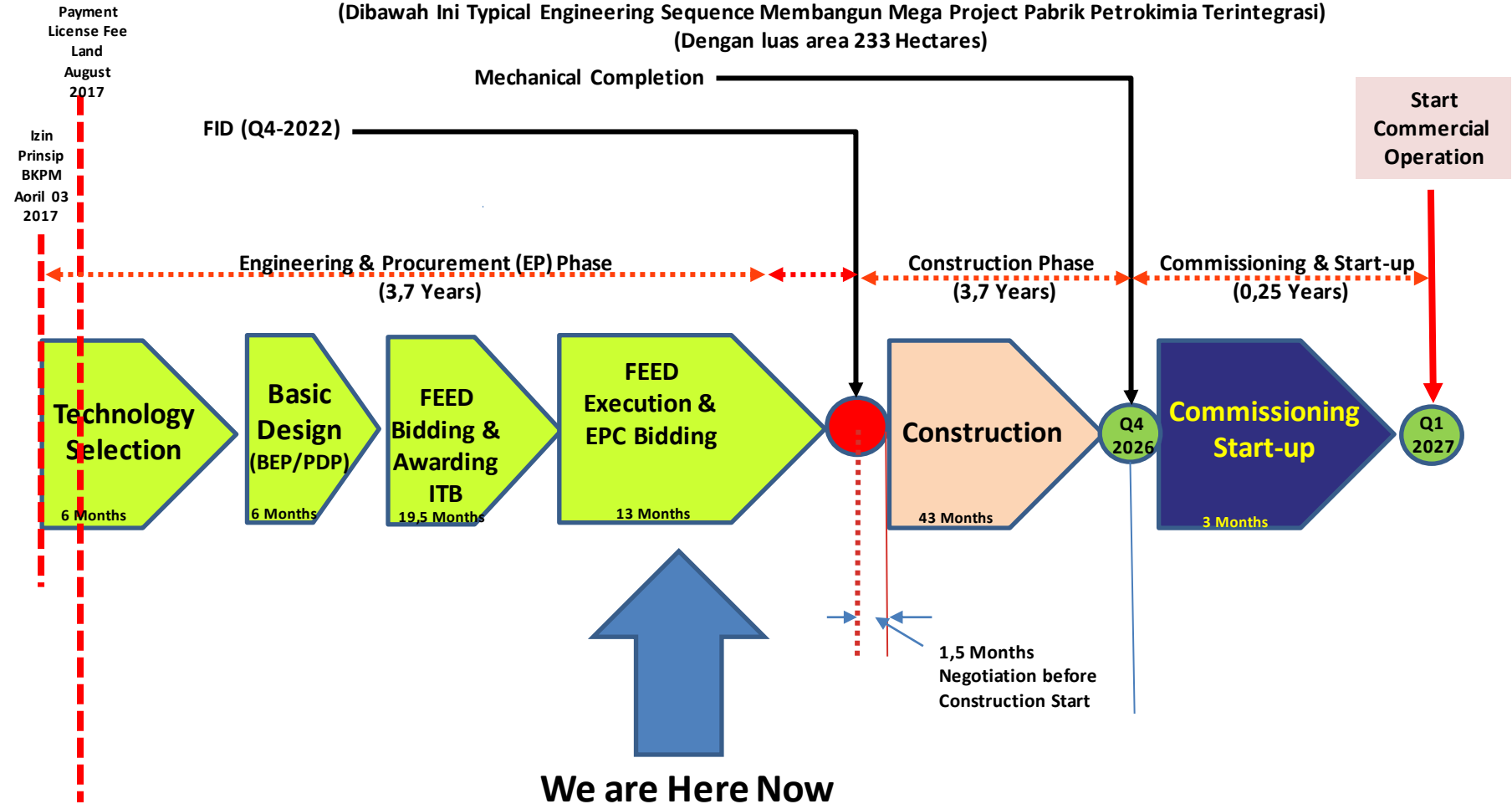
Video
Sasol-USA
Ethane Cracker Construction

Kenapa Industri Petrokimia Terintegrasi Butuh Waktu 10 Tahun

(Dalam Pembangunannya Pada Masa Pandemi Covid-19)

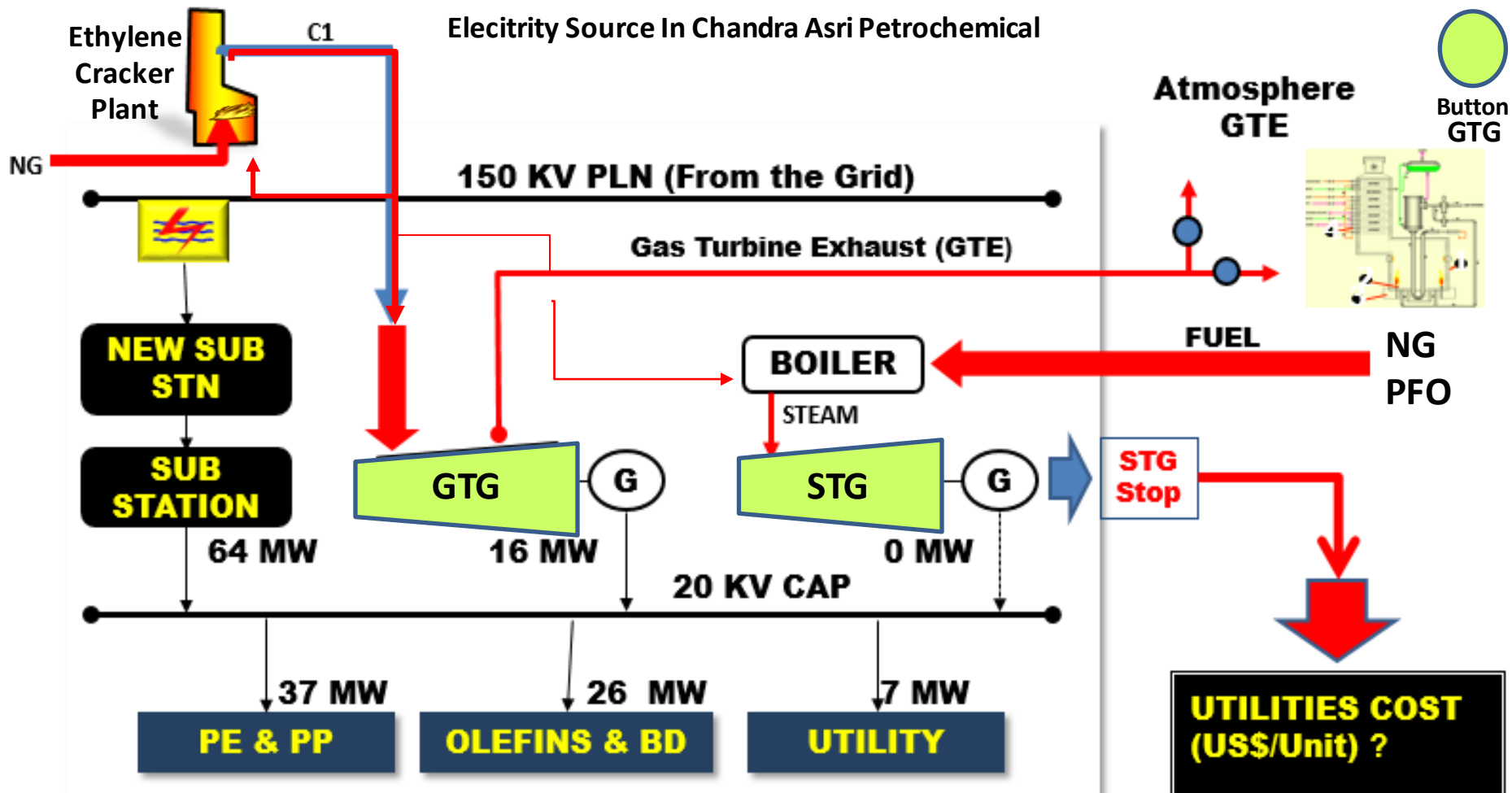
(Dibawah Ini Typical Engineering Sequence Membangun Mega Project Pabrik Petrokimia Terintegrasi)

(Dengan luas area 233 Hectares)



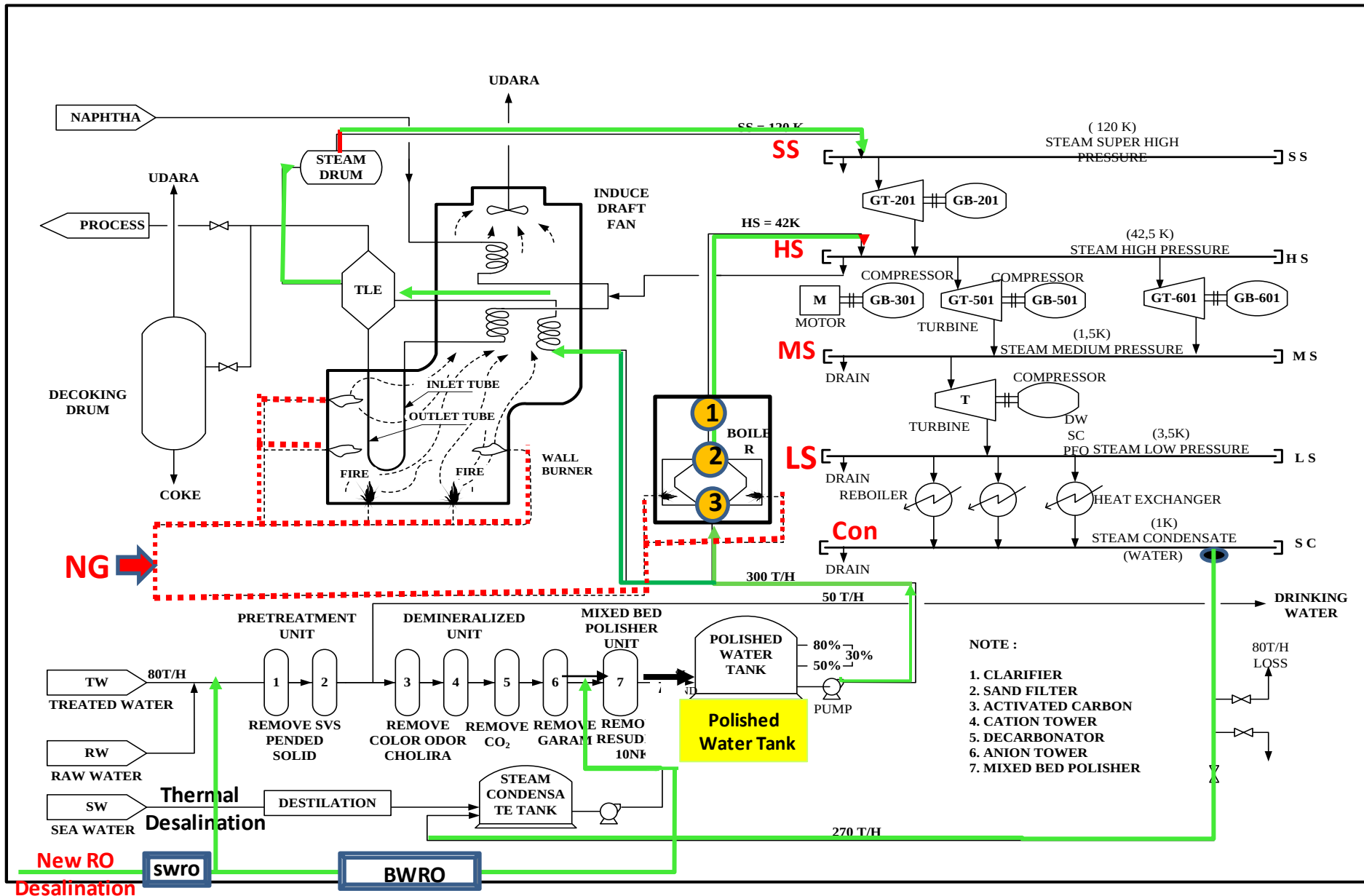
PETA SEBARAN INVESTASI Industri Petrokimia 2020-2030





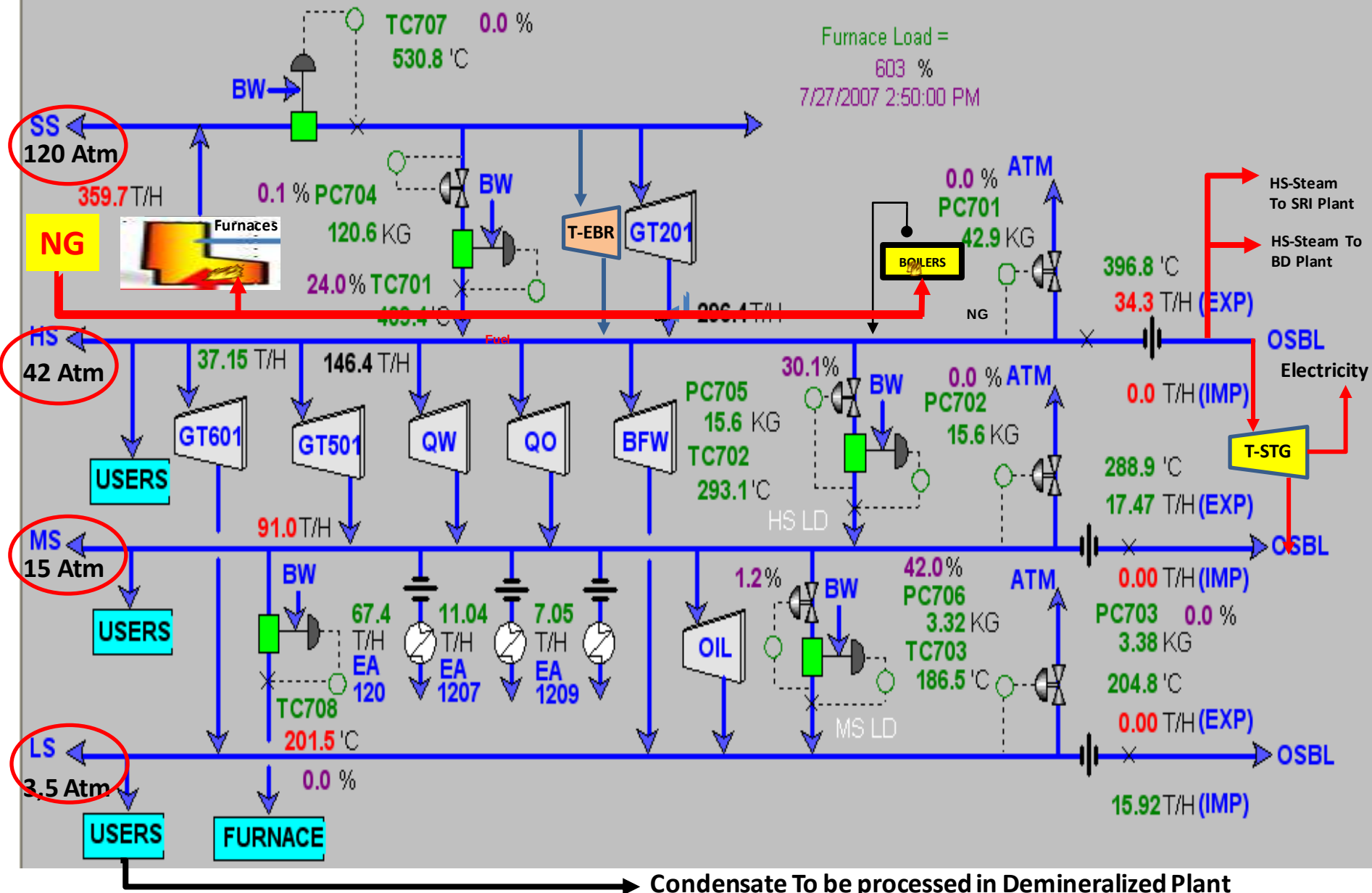
SOURCE	US\$/MWH	MW
PLN		64
GTG		16
STG		0

Overall Steam & Water System in Chandra ASri



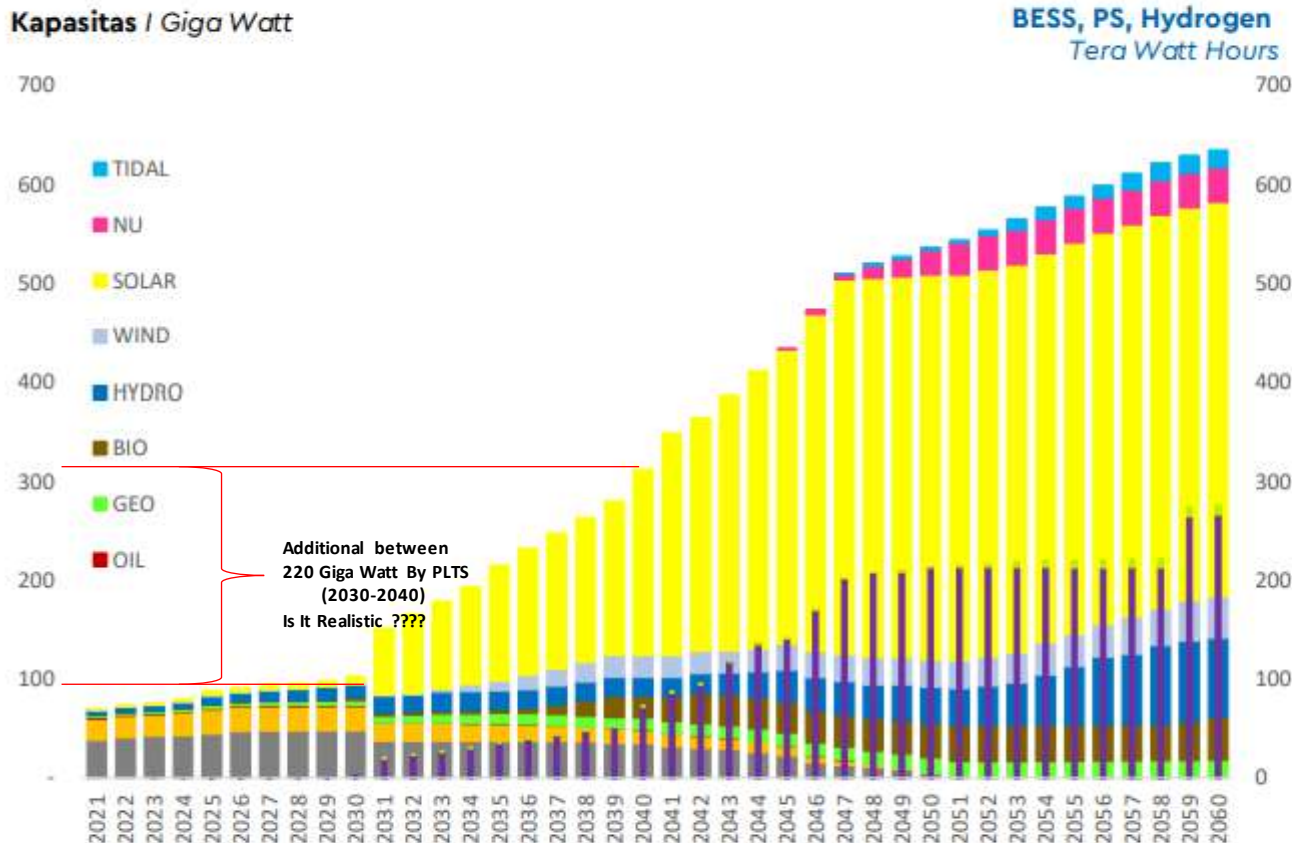
One Of Energy Source in Ethylene Cracker Plant

012. ISBL STEAM SYSTEM



RENCANA PENYEDIAAN LISTRIK MENUJU NZE

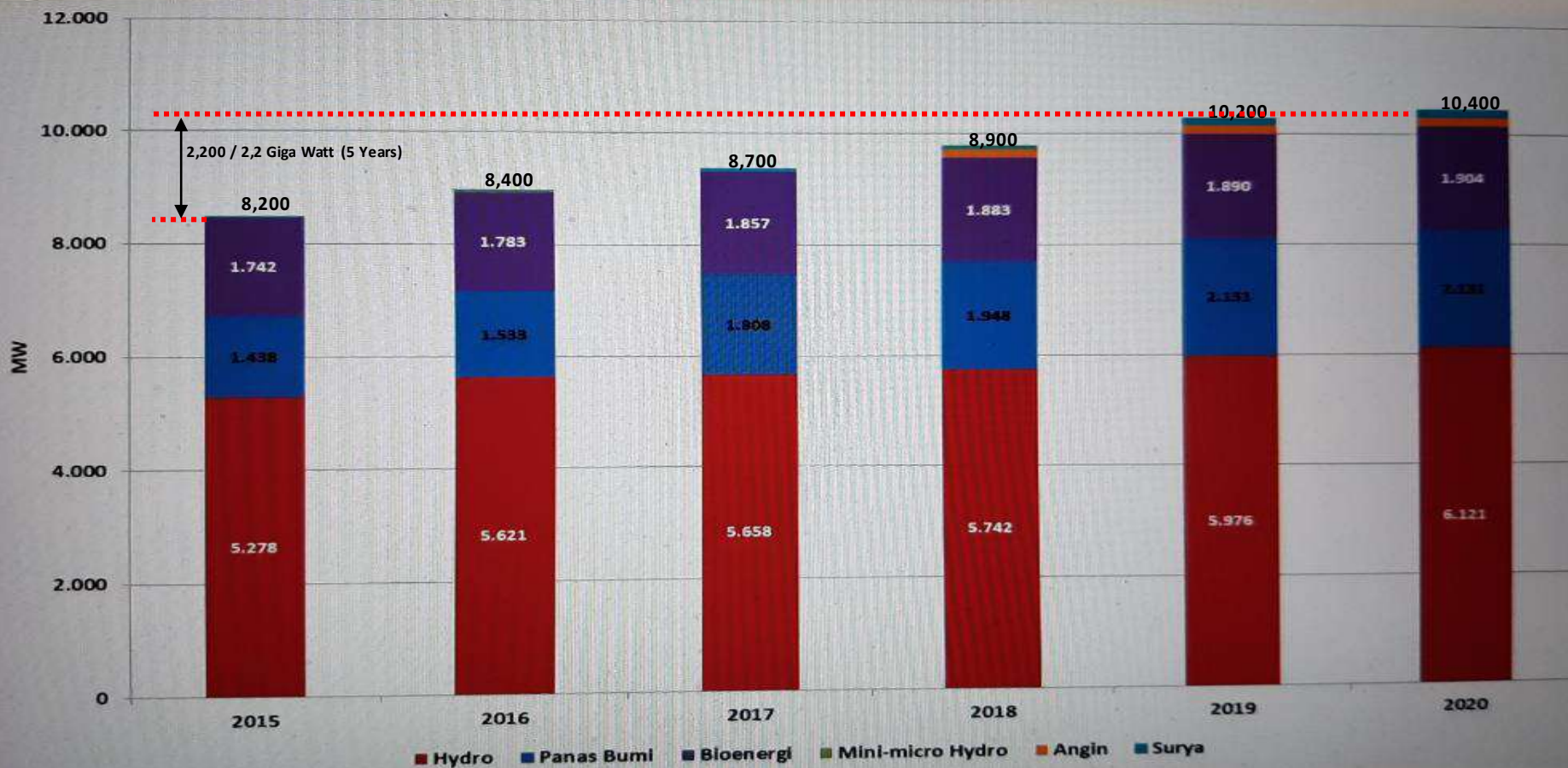
Kapasitas / Giga Watt



Catatan: Tahun 2021-2030 proyeksi berdasarkan Draft RUPTL. Pasca 2030 berdasarkan proyeksi pemodelan (least cost)

1. **PLTU/PLTGU:** Tidak ada tambahan PLTU kecuali telah kontrak dan konstruksi.
2. **EBT:** Tambahan pembangkit setelah 2030 hanya dari EBT. Tenaga surya akan mendominasi.
3. **PLTN:** masuk sekitar 2045 dan mencapai 35 GW di 2060.
4. **PEMANFAATAN ENERGI STORAGE:** *pump storage, Battery Energy Storage System (BESS), dan hydrogen fuel cell* mulai masif setelah 2035. Hydrogen dimanfaatkan mulai 2031.

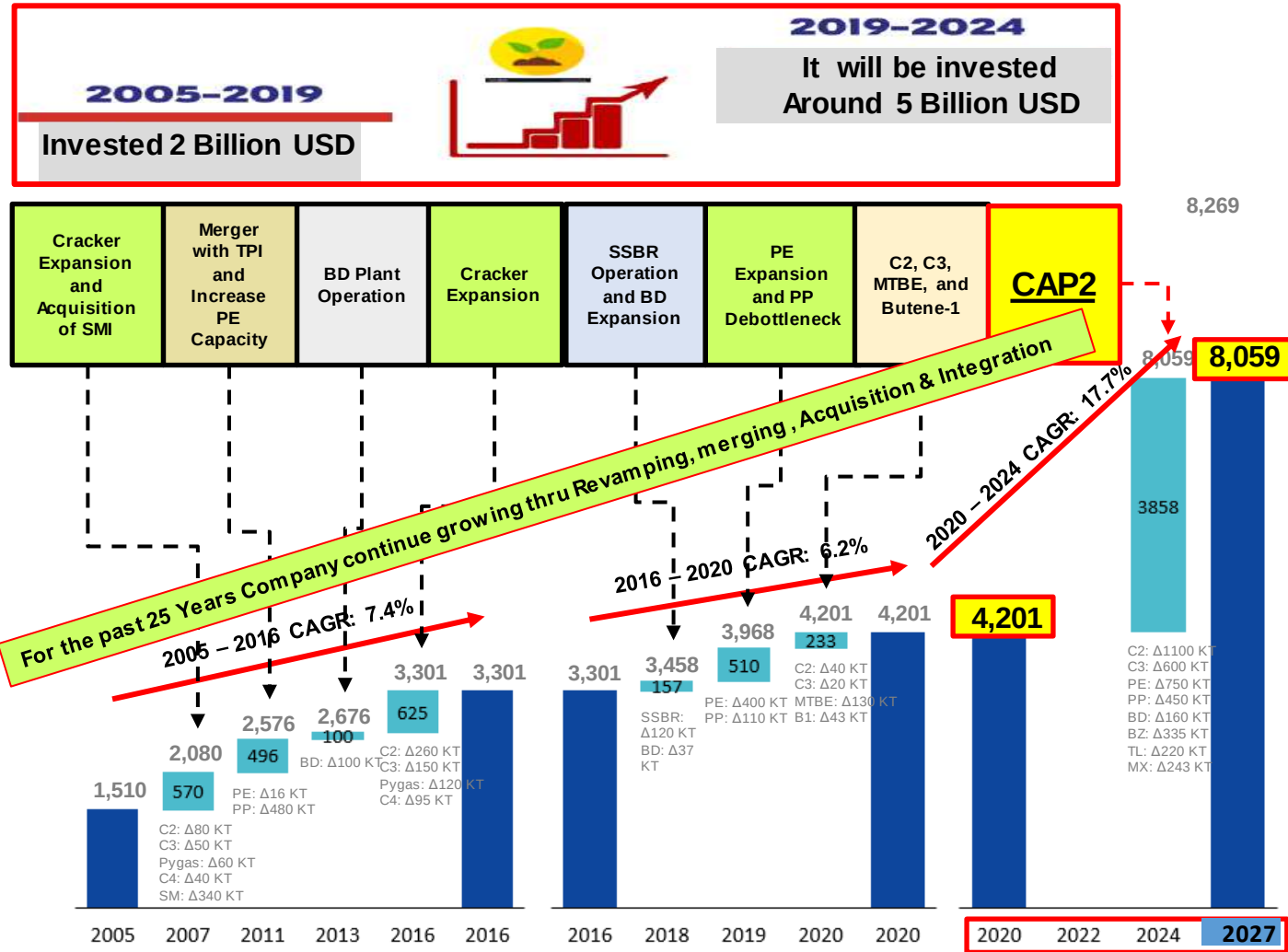
PERKEMBANGAN KAPASITAS PEMBANGKIT EBT (MW) TAHUN 2015 - 2020



Chandra Asri Commitment For Indonesia

Continue growing

(To reduce Import & To create Job opportunity)



U.S. Petrochemicals Value Chain



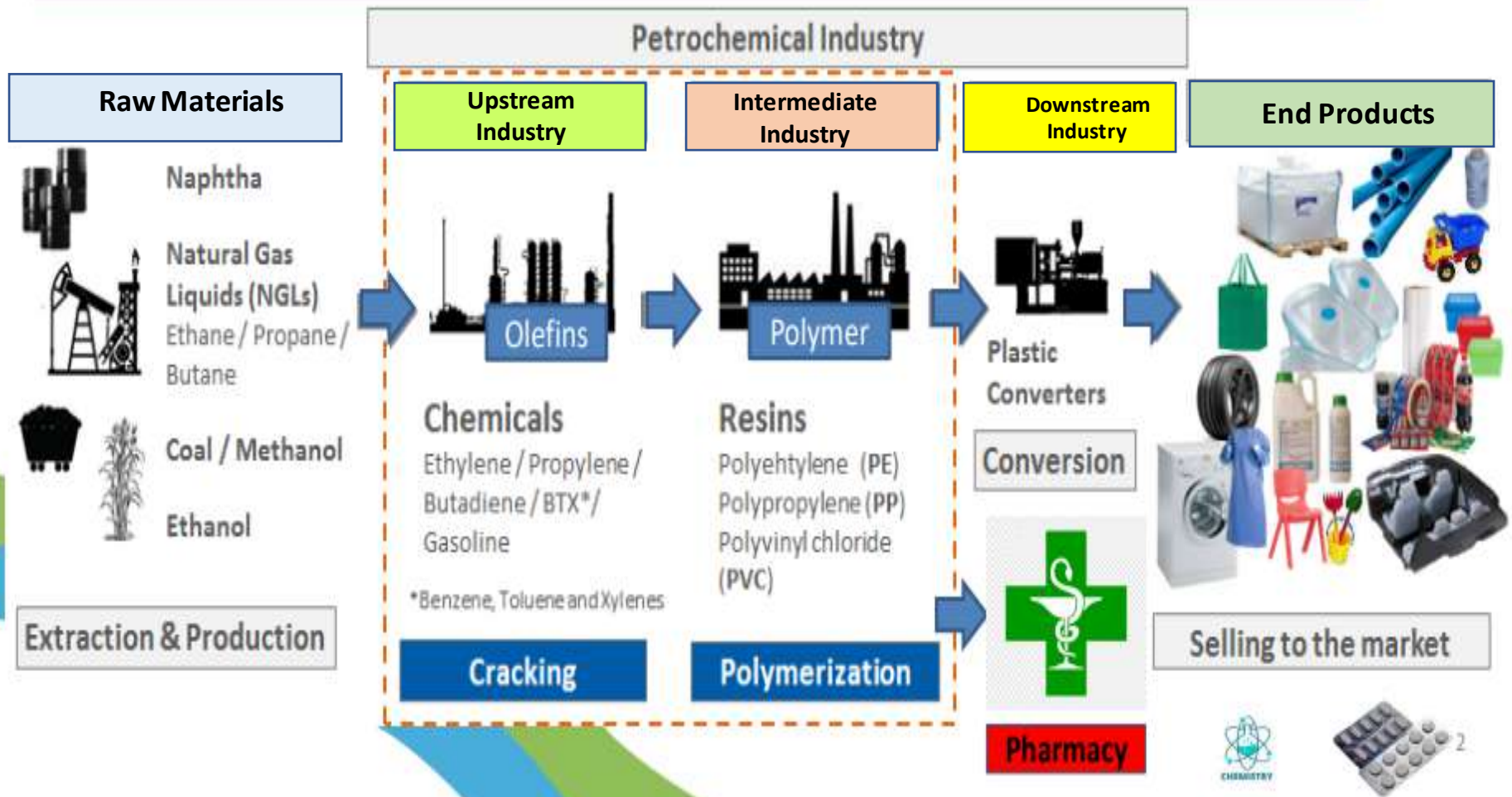
Petrochemicals: 5%
Value: \$527 Billion

Fuels: 81%
Value: \$509 Billion

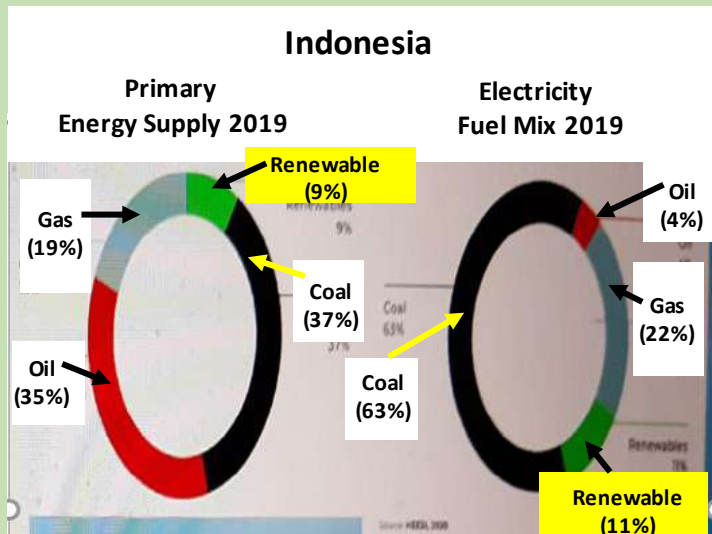
US Annual Consumption: 7 Billion Barrels
Source: US Energy Information Administration

Ringkasan

- Industri petrokimia merupakan tulang punggung (backbone) bagi sebagian besar sektor industri karena digunakan sebagai bahan baku berbagai industri hilirnya untuk memenuhi kebutuhan rumah tangga, sandang, pangan, papan, automotif, elektronik, infrastuktur, energy dan Obat-obatan.
- Bahan baku industri petrokimia dapat berasal dari minyak bumi, gas bumi dan batubara
- Produk petrokimia yang saat ini menggunakan bahan baku minyak bumi, gas bumi dan batubara, ke depan dapat juga dihasilkan dari hasil pertanian seperti kelapa sawit dan biomassa dlsb



Kesimpulan & Rekomendasi



1. Respon terhadap perubahan iklim harus bersifat global, integral & harmonis.
2. Perlu strategi keseimbangan antara “pemulihan & pertumbuhan” ekonomi dan program pengurangan emisi CO₂, mengingat :
 1. Sebagian besar energi primer Indonesia adalah bahan bakar fosil (91 %)
 2. Sebagian besar energi listrik kita masih bahan bakar Fosil=89 % (Batubara=63%, Gas=22% & Oil=4%)
 3. Seberapa cepat Teknologi EBT yang sekarang dapat menggantikan fosil fuel yang secara economic viable
3. Mengusulkan penerapan strategi Insentif/Disinsentif dan “Cap & Trade / Tax” dari pada strategi Pajak Carbon. Dalam mengurangi emisi Gas Rumah Kaca (GRK)
4. Kolaborasi dan komunikasi yang intensif antar berbagai pemangku kepentingan yang dilakukan secara transparan dan didasari oleh mutual trust sangat penting, Untuk memastikan keterlibatan, partisipasi dan dukungan dari berbagai pihak (Pemerintah, Industri, swasta dan masyarakat).
5. Strategi yang diambil oleh negara pada saat ini ini akan menentukan apakah ditahun 2050 akan menjadi Indonesia Emas atau malapetaka bagi anak cucu kita



THE INDONESIA OLEFIN,
AROMATIC & PLASTIC
INDUSTRY ASSOCIATION

Thank You