



PETROVIETNAM



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Integration Strategy in Refining and Petrochemical Complex

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AGENDA

I

PETROVIETNAM's Downstream in Brief

II

Strategy for Dung Quat Refinery Development

III

Dung Quat Refinery Upgrading & Expansion Project

IV

Refining and Petrochemical Integration

V

Conclusions



- **Founded on September 3, 1975**
- **Employees: over 55,000**
- **Assets Value: USD\$ 34.4 Billion (for 2014)**
- **Total Revenue: USD\$ 33.9 Billion (for 2014)**
- **Profit: USD\$ 2.1 Billion (for 2014)**
- **Contribution to the State Budget: USD\$ 7.4 Billion (for 2014)**
- **Core Business:**
 - **Oil & Gas Exploration and Production**
 - **Refinery, Petrochemical and Bio-Fuel**
 - **Gas Industry**
 - **Power Generation**
 - **Petroleum Services**



I. Petrovietnam Overview

PVN has 2 refineries, 4 petrochemical plants and 2 bio-fuel plants

In Operation

Dinh Vu Polyester Plant
175 KTA Polyester PSF and Filament, 2013

Dung Quat Refinery
6.5 MMTPA, 2009

Polypropylene Plant
150 KTA, 2009

Quang Ngai Bio-Ethanol Plant
100.000 m³/year, 2013

Binh Phuoc Bio-Ethanol Plant
100.000 m³/year, 2013

Phu My Condensate Plant
270 KTPA, 2004

Phu My Fertilizer
800 KTPA of Urea, 2004

Ca Mau Gas - Power - Fertilizer Complex
800 KTPA of Urea, 2012

Under Construction and Developing

Nghi Son Refining & Petrochemical Complex
(JV 25.1% by PVN)
9.5 MMTPA, (2013-2017)

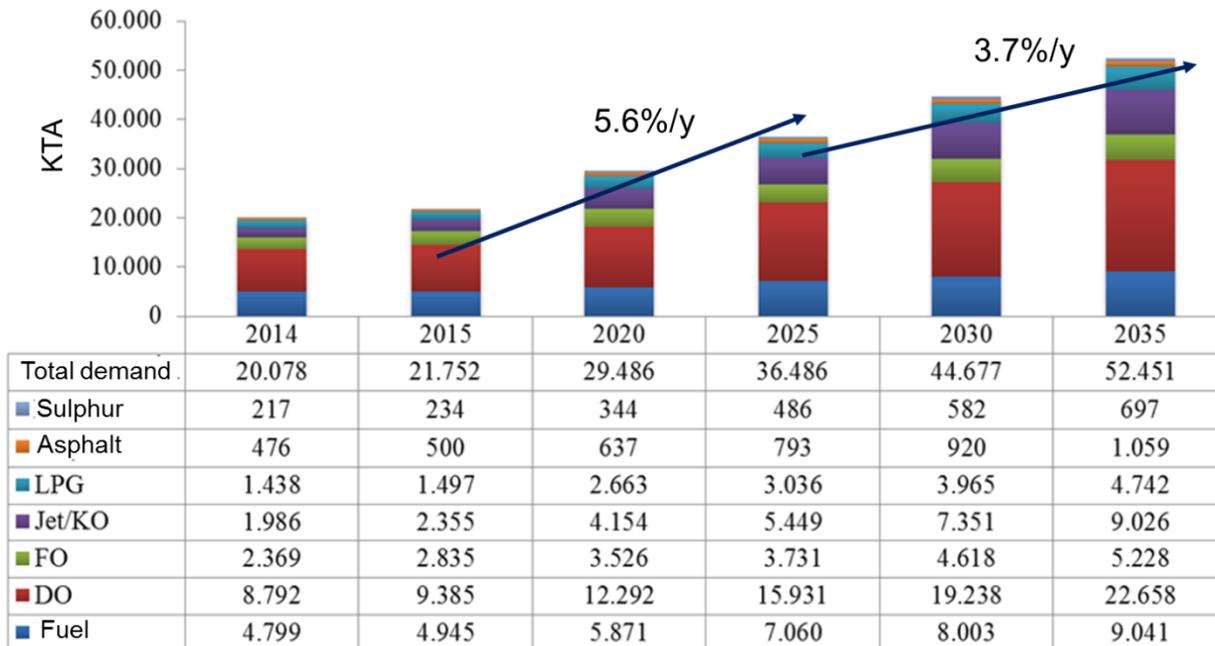
Dung Quat Refinery Upgrading and Expansion Project
8.5 MMTPA, (2013-2022)

Long Son Petrochemical Complex (JV 29% by PVN)
468 KTPA PP,
450 KTPA HDPE,
500 KTA LLDPE
(2008-2019)



Overview of Refining Production in Vietnam

- Stage 2016 - 2017: Vietnam shortages a large volume of fuel products (60-70%).
- Stage 2017-2018: After the Nghi Son Refining and Petrochemical complex put in operation, the total fuel supply meets 50% of domestic demand.
- Stage 2019-2021: Dung Quat refinery expansion project (expected early 2021) in operation, the fuel supplies to the domestic market will increase, but Vietnam also need to import 30-33% fuel.
- Stage 2022-2025: Due to increasing market demand, Vietnam still shortage 33-42% of fuel production.



Source: Wood Mackenzie (2014)

Overview of Petrochemical Production in Vietnam

- In years of 2020, Vietnam is expected to remain slightly short of the core thermoplastics (PET, PE & PP) with the deficit increasing over time.

(Source: customs, PVPro (VPI), 2015)

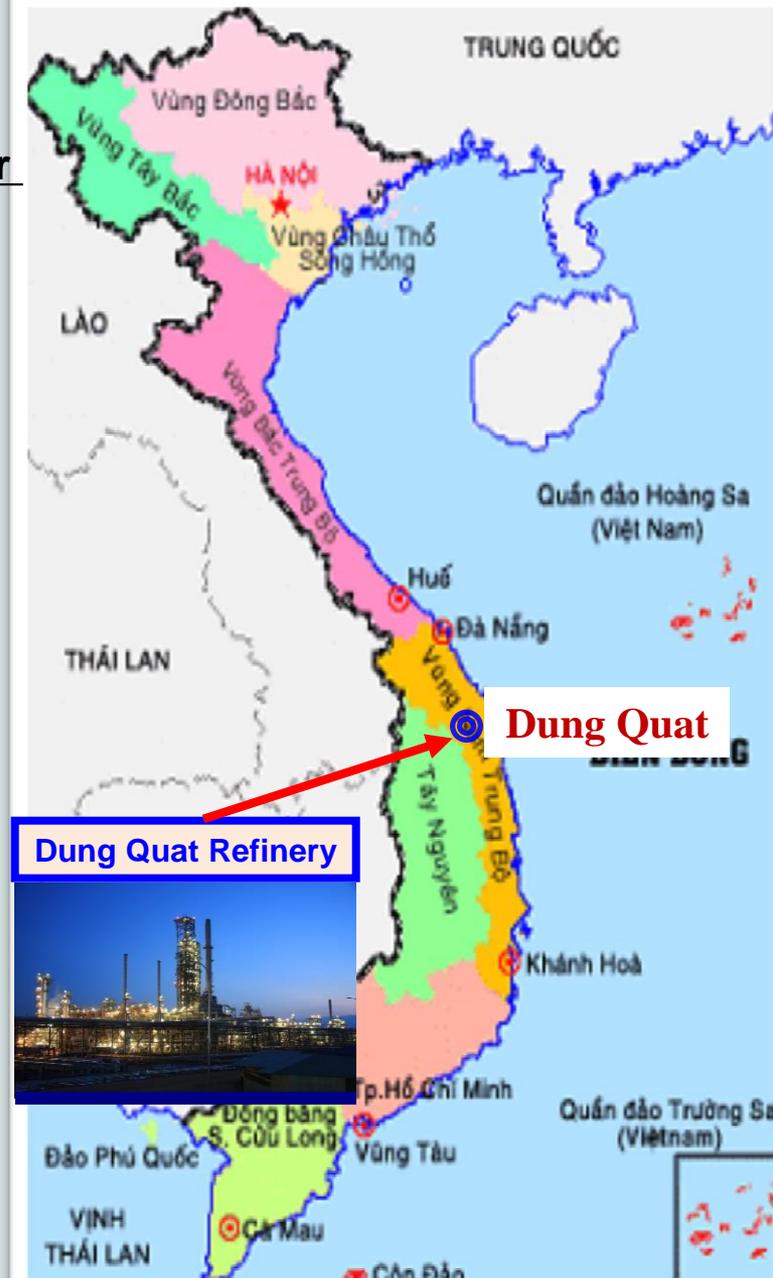
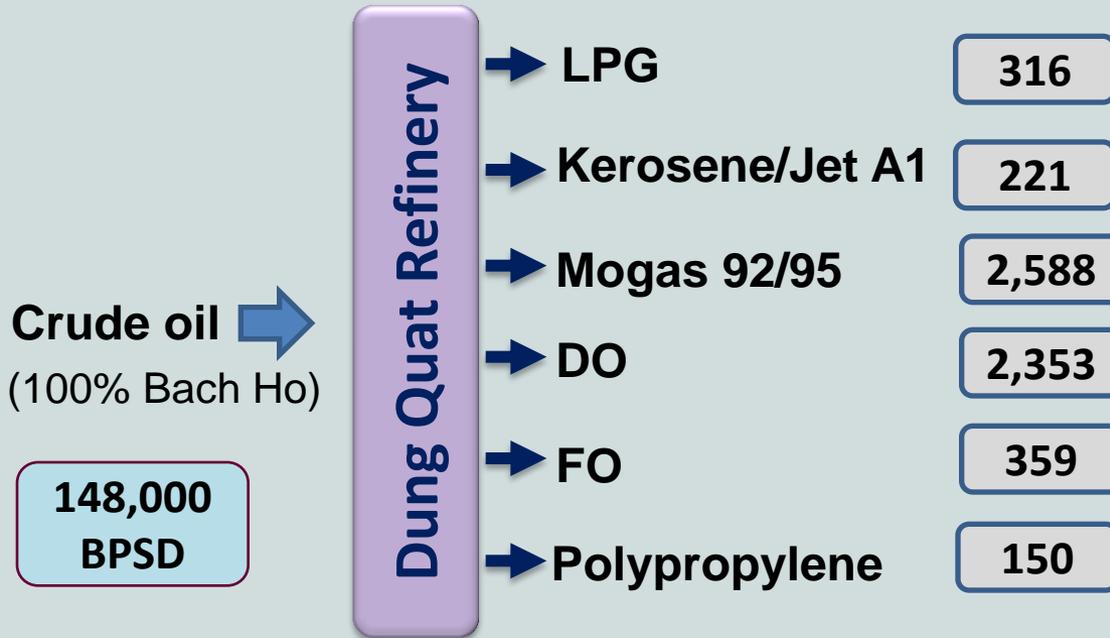
Unit: Thousand Ton

Products		Dem. 2015	2020		2025		2030		2035	
			Sup.	Sup.-Dem.	Sup.	Sup.-Dem.	Sup.	Sup.-Dem.	Sup.	Sup.-Dem.
Plas. – Fib.– Ela.	PE	1.122	1.557	-607	1.812	-862	2.022	-1.072	2.196	-1.246
	PP	915	1.286	-306	1.532	-536	1.762	-766	1.958	-963
	PS	196	302	-248	424	-370	531	-477	643	-589
	PVC	563	855	-455	1.183	-783	1.480	-1.080	1.787	-1.387
	EVA	115	195	-195	293	-293	375	-375	463	-463
	MMA	20	31	-31	46	-46	58	-58	71	-71
	PET	513	627	-216	750	-339	844	-434	952	-541
	ABS	118	179	-179	247	-247	309	-309	373	-373
	SBR	60	91	-91	126	-126	157	-157	189	-189
Chem.	MEG	85	116	-116	117	-117	118	-118	120	-120
	DOP	53	65	-35	76	-46	88	-58	100	-70
	LAB	117	175	-175	228	-228	280	-280	333	-333
	SM	69	79	-79	93	-93	104	-104	116	-116
	PTA	251	296	-296	296	-296	296	-296	297	-297
	MeOH	171	293	-293	322	-322	348	-348	376	-376
Fertilizer	NPK	4.011	4.342	2.830	4.564	2.608	4.796	2.376	5.041	2.131
	SA	1.097	1.153	-1.153	1.212	-1.212	1.274	-1.274	1.339	-1.339
	Urea	2.278	2.394	246	2.516	124	2.645	-5	2.780	-140

II. Strategy for Dung Quat Refinery Development

CONFIGURATION OF DUNG QUAT REFINERY

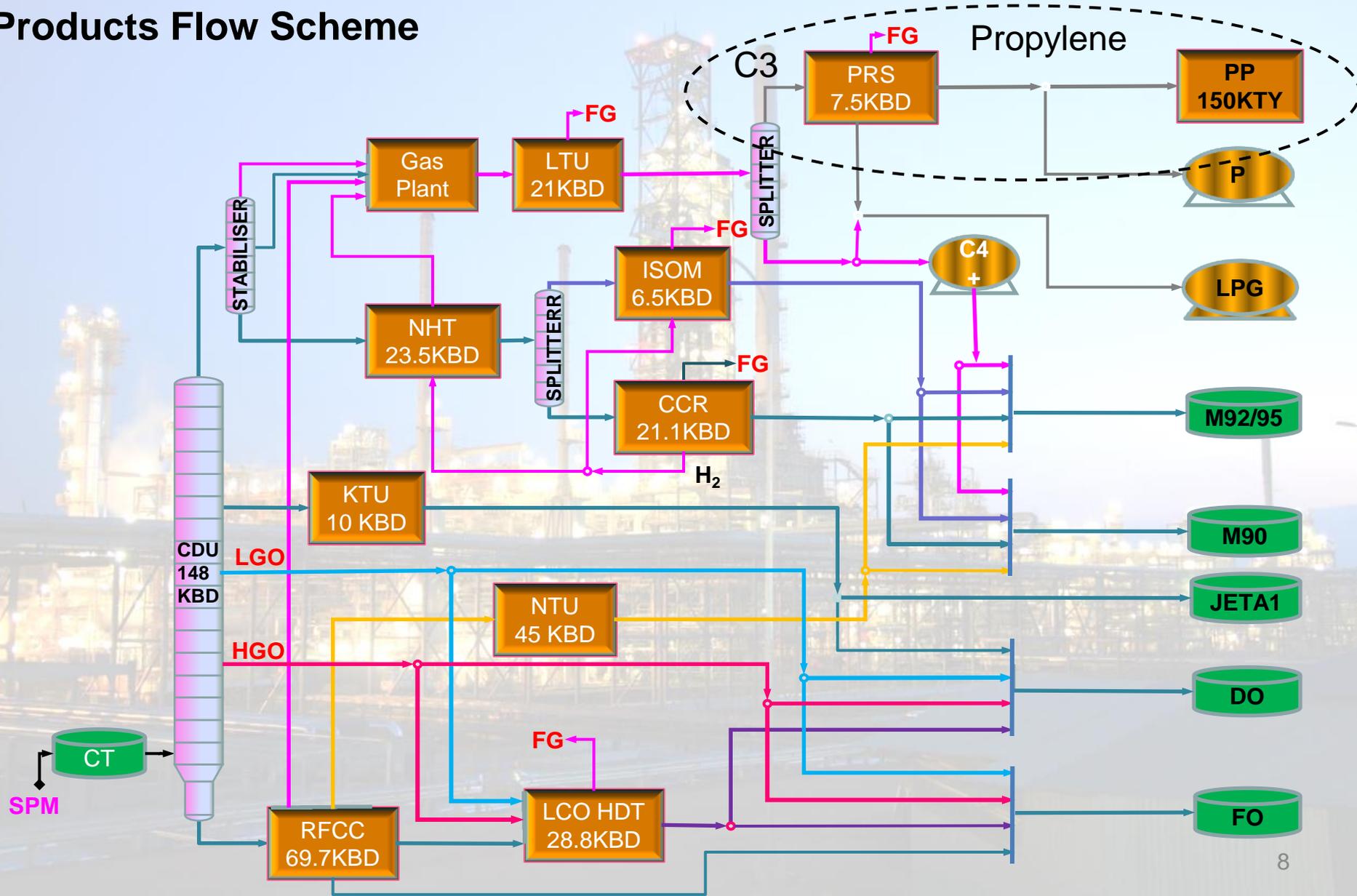
Thousand Ton / Year



- Owner: 100 % by Petrovietnam
- Status: First production 2/2009;
Handover 05/2010
Operating at 100% -105% designed capacity
- Satisfy 30% of the domestic demand for gasoline

II. Strategy for Dung Quat Refinery Development

Products Flow Scheme



II. Strategy for Dung Quat Refinery Development

Challenges

Meeting increasing local demand

Increasing Refining Value

Diversifying Feedstock

Meet more stringent product specifications

Low margin of refining



Initiatives

Increasing Refining capacity from 148,00 BPSD to 192,000 BPSD

Heavy and sour crudes; Bottom up-gradation

Natural gas for power generation, Fuel gas and H₂ generation;

Meeting EURO-V Gasoline/Gas Oil specifications

Refining / Petrochemical integration: Value added products

Competitive Solutions to Answer Challenges:

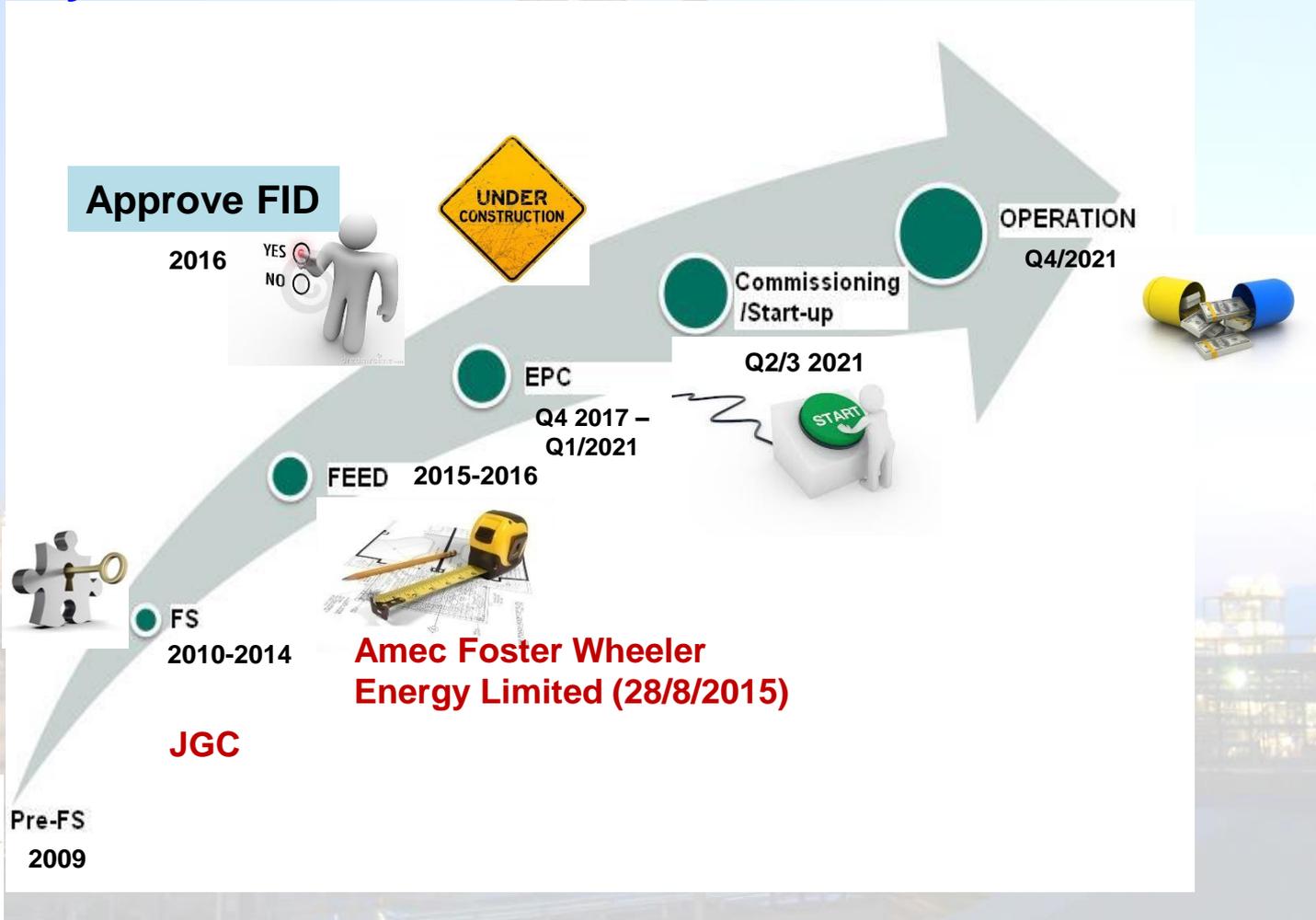
➤ Solution 1 - In the short term:

- ❖ To blend Bach Ho crude with other crude oil sources (domestic and import) with higher mixing ratio;
- ❖ To install additional SRU (Sulfur Recovery Unit) *(finished)*.

➤ Solution 2 - In the long term:

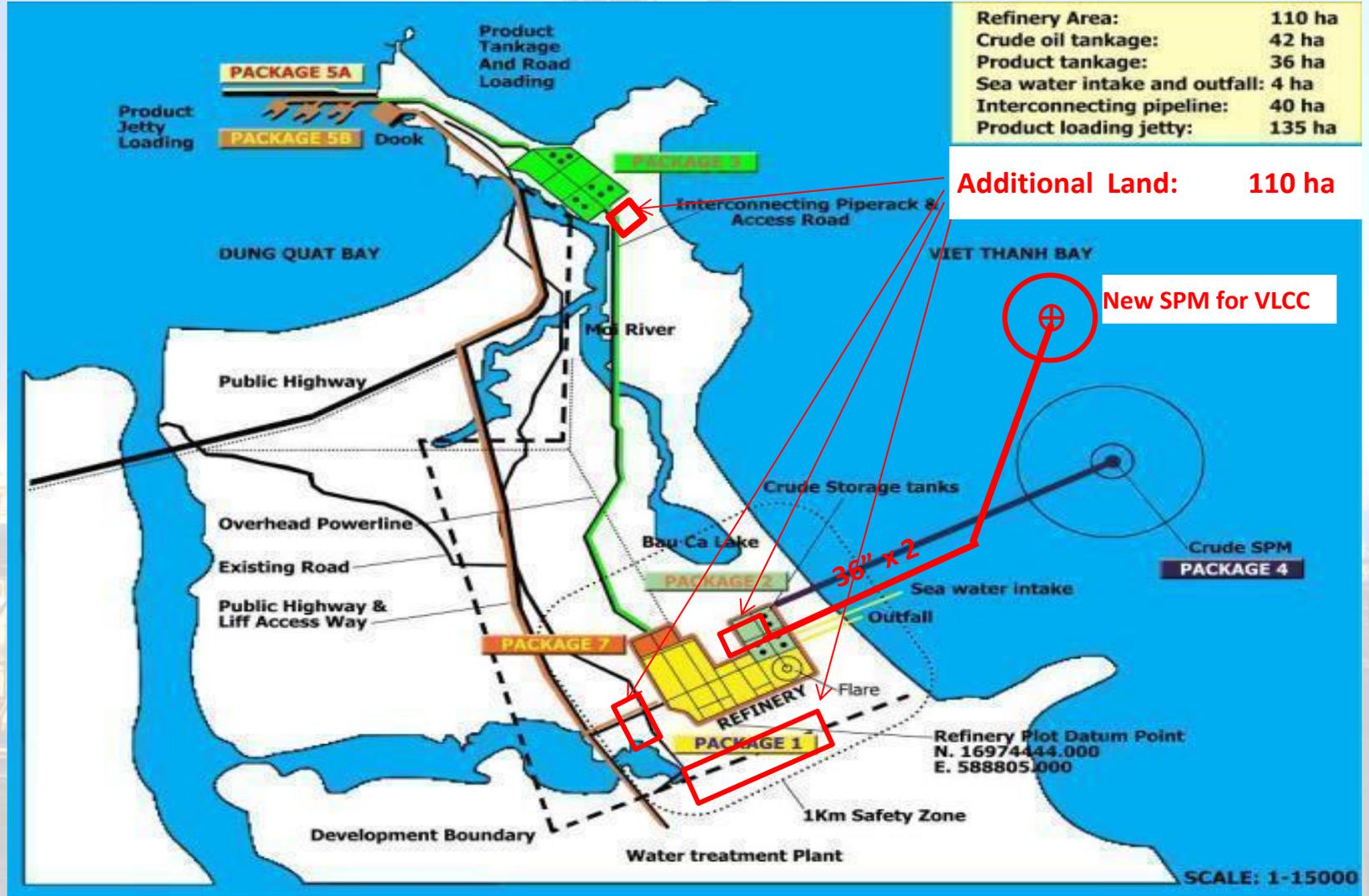
- ❖ To replace completely Bach Ho crude with imported crude sources **(will be applied for Dung Quat Refinery Upgrading and Expansion Project, 2015 – 2021)**;
- ❖ Using natural gas as a supplement feedstock for Dung Quat refinery;
- ❖ Integration with Petrochemical complex using Natural gas as feedstock;

Project Key Milestones



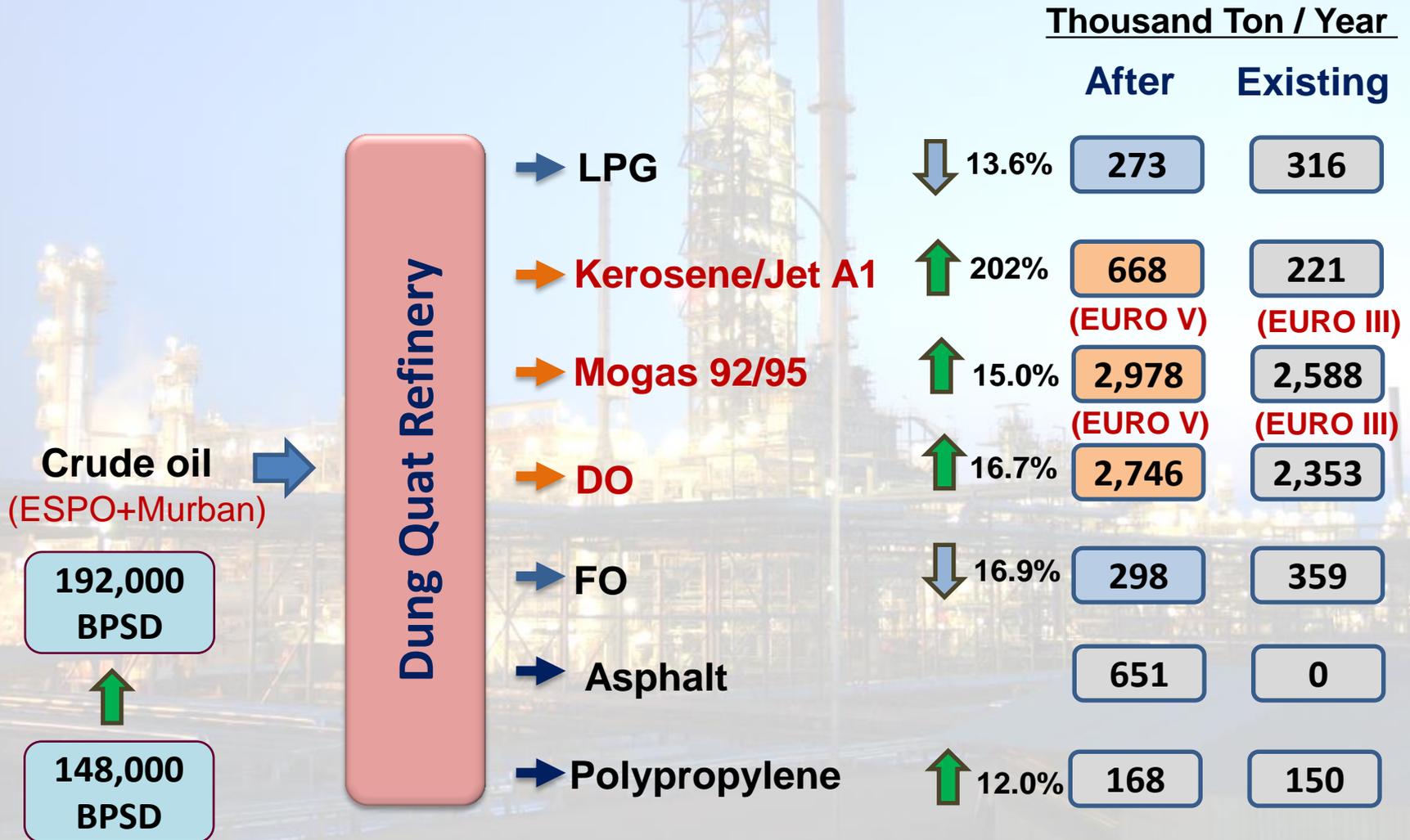
III. Dung Quat Refinery Upgrading & Expansion Project

Land Layout



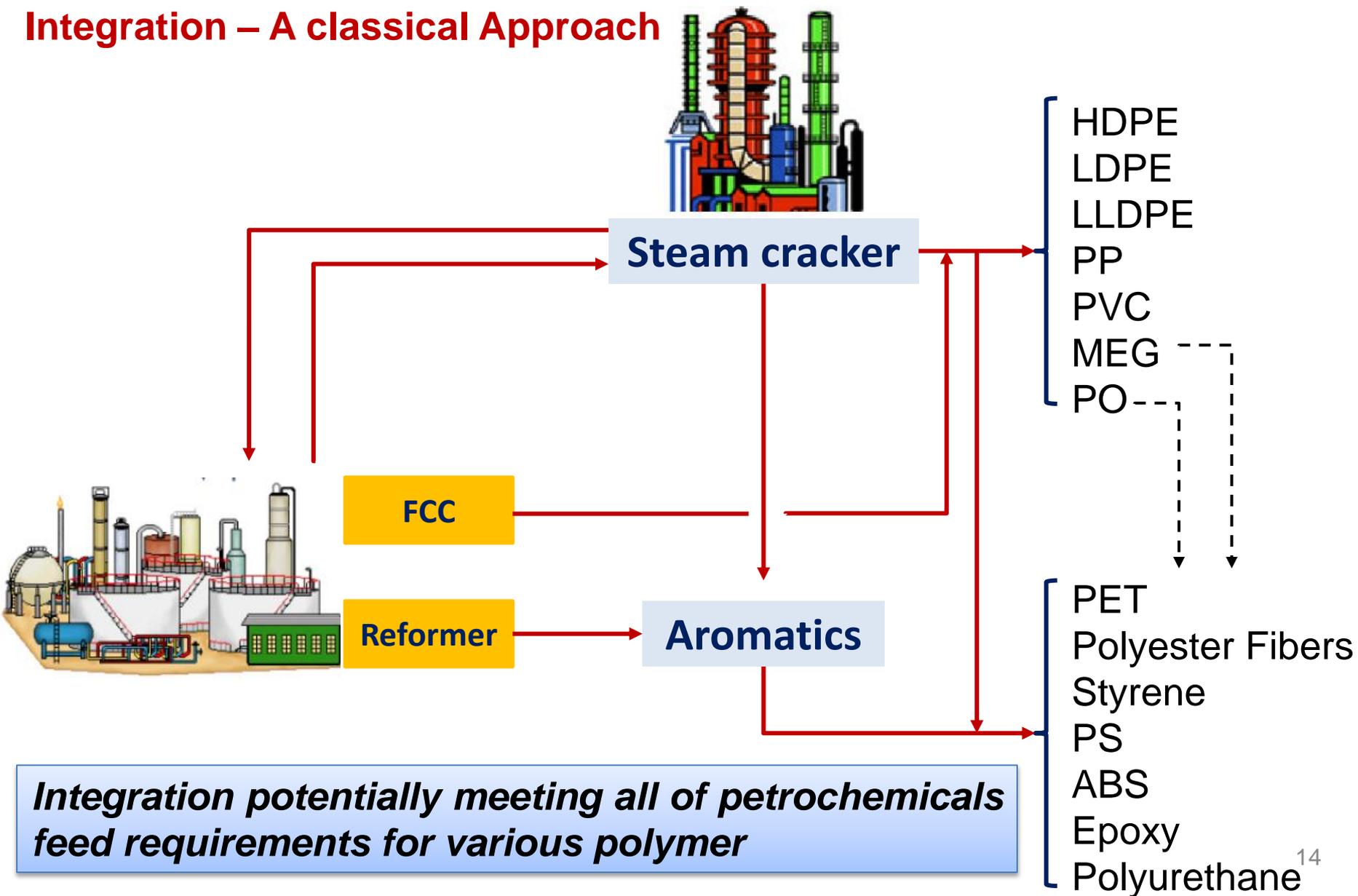
III. Dung Quat Refinery Upgrading & Expansion Project

Expected Production after Upgrading & Expansion

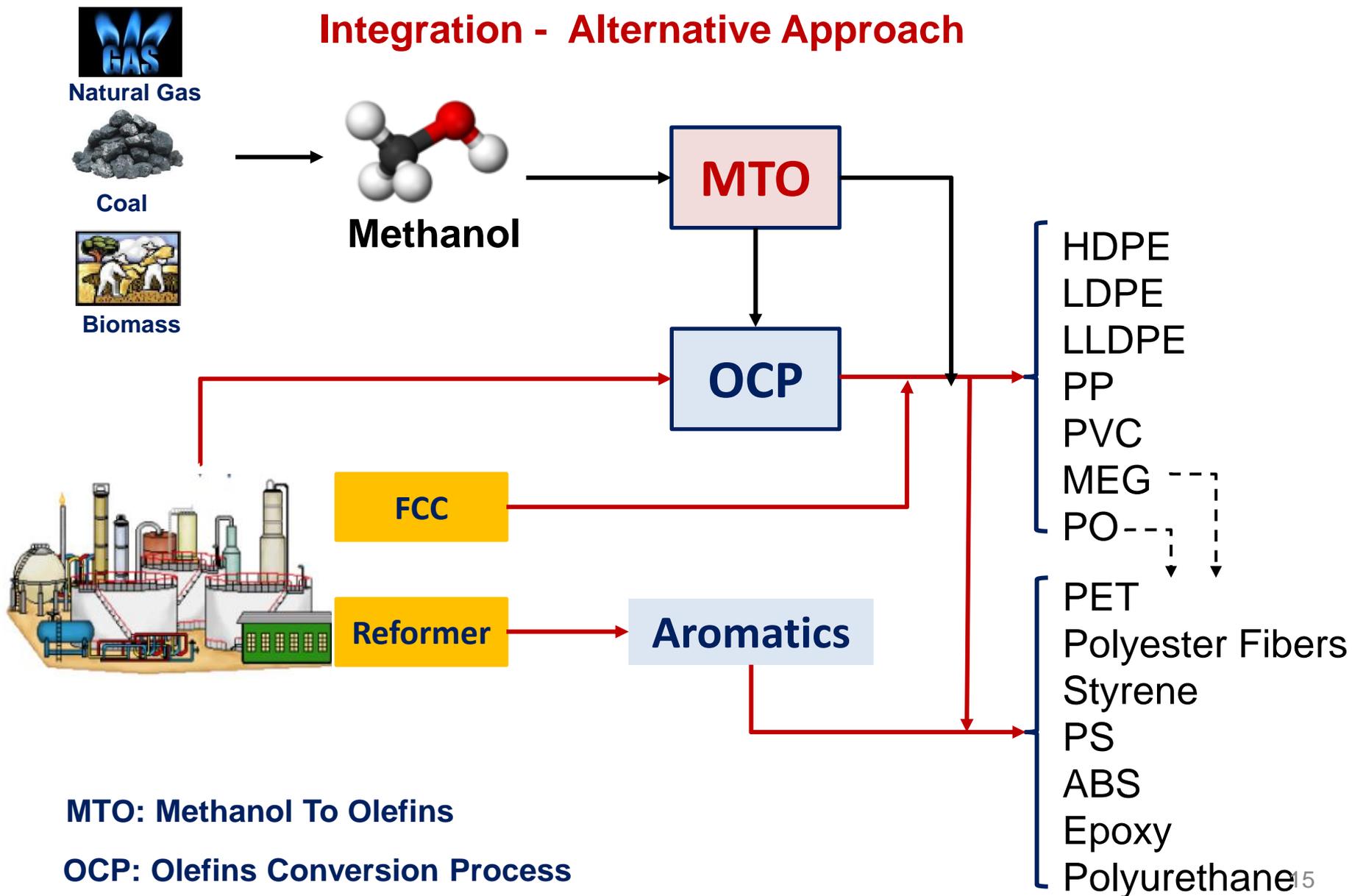


IV. Refining and Petrochemical Integration

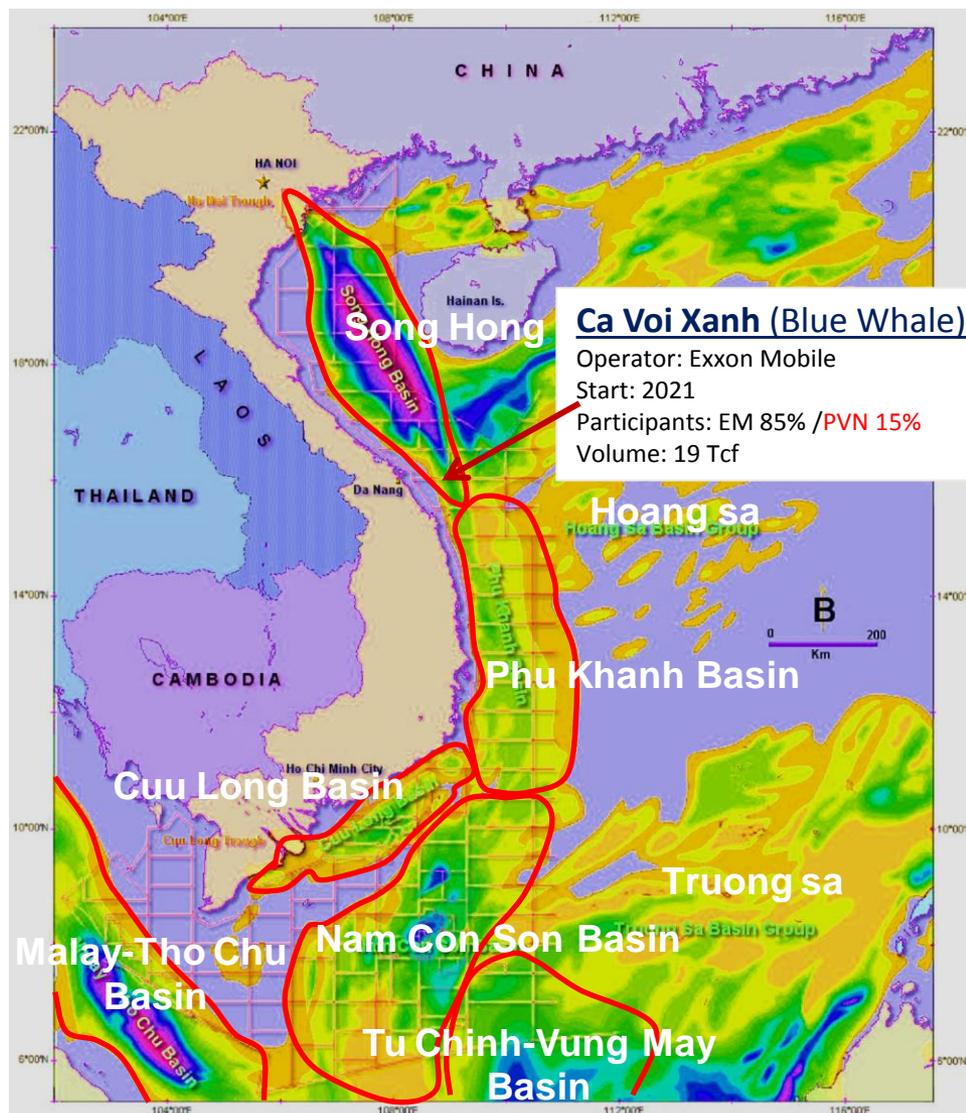
Integration – A classical Approach



IV. Refining and Petrochemical Integration



Ca Voi Xanh Natural Gas Field



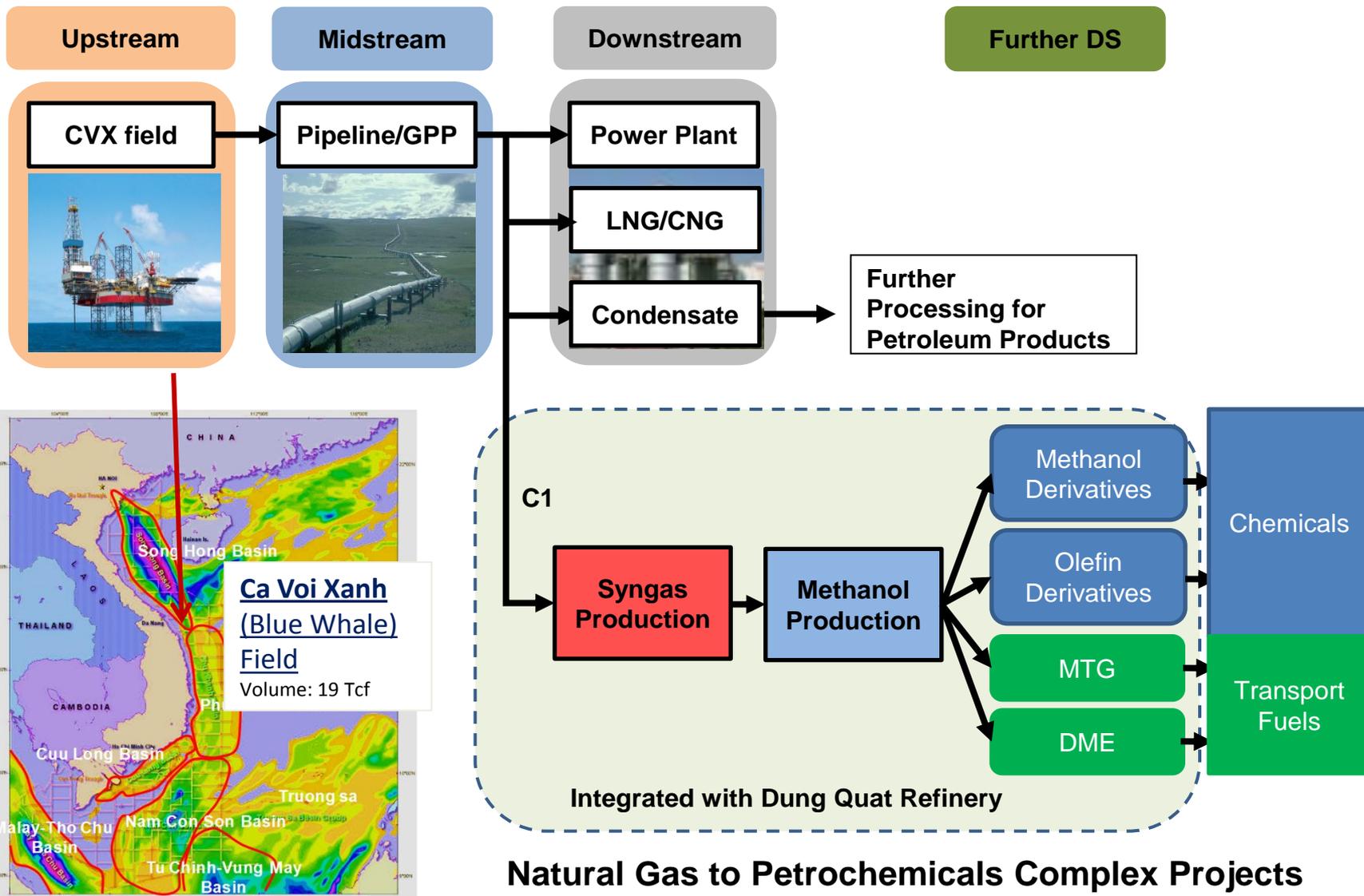
Ca Voi Xanh (Blue Whale)

Prospect:

- Location: offshore of Da Nang
- Distance: ~ 80 km to central Vietnam shore
- Operator: ExxonMobil
- Estimated reserves: : 19 Tcf (Gross) (538 bcm)

IV. Refining and Petrochemical Integration

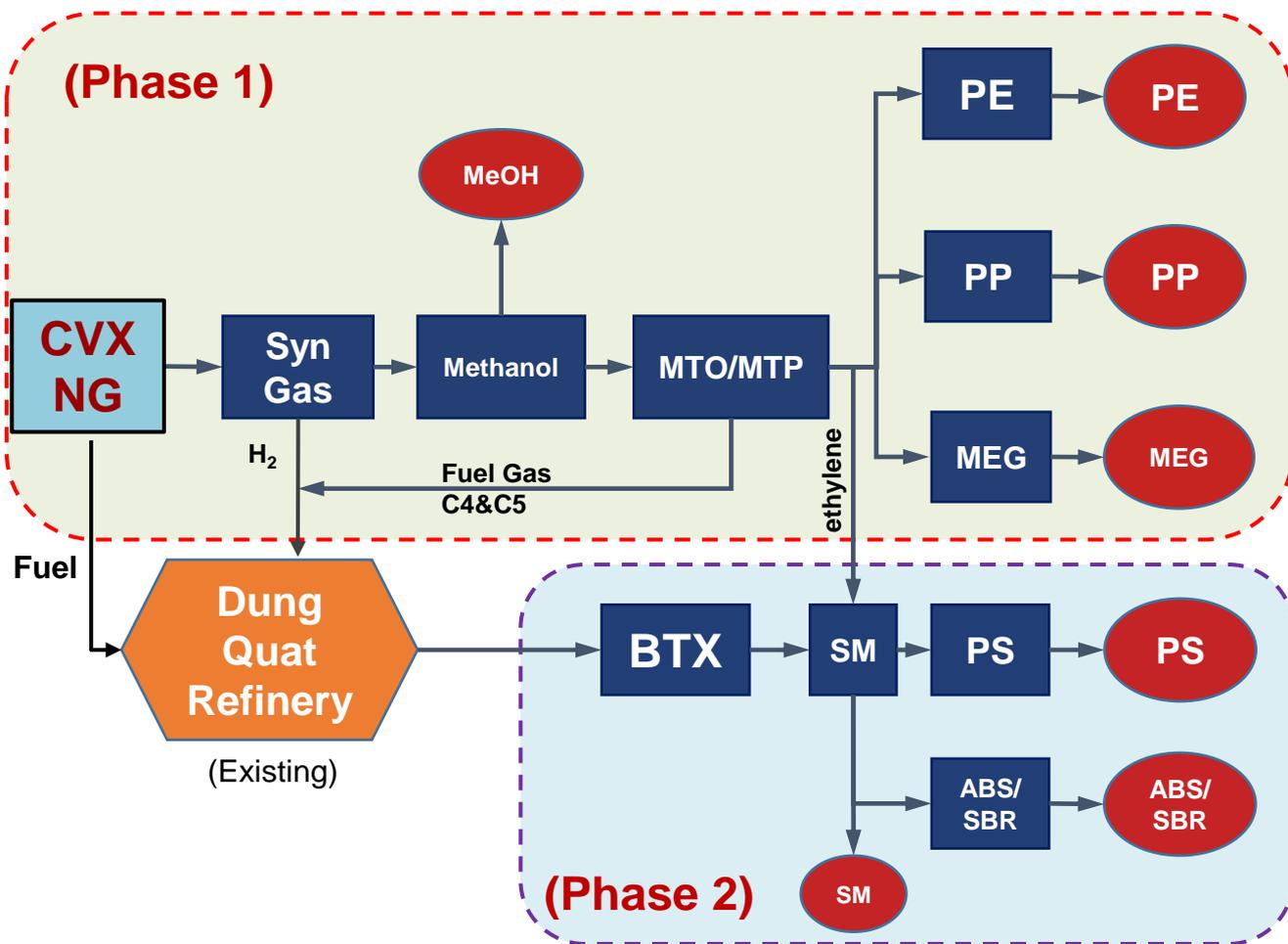
Master Plan for Exploitation and Development of CVX Gas Field



Natural Gas to Petrochemicals Complex Projects

Central Refinery - Petrochemical Complex using CVX Gas (proposal 2023 - 2035)

- Location: Quang Ngai/Quang Nam
- Investor: Refining and Petrochemical Corporation/Binh Son Refinery
- Capacity: 1.7 billion m³/year of CVX Natural gas
- Expected Products: High value added products: Methanol, polyethylene, Propylene, PS, SBR, and Derivatives.
- Form of Investment: Joint venture or Self-Investment.



1. For the Vietnamese market of refining and petrochemical products, the gap between supply and demand has been still high and tends to increase in the future. It has potential opportunities for developing new petroleum projects in Vietnam.
2. Feedstock for petrochemicals is almost from crude oil. Therefore, products are simple and limited. It is necessary to diversify both feedstock and products.
3. Optimized integration between the Dung Quat refinery and the petrochemical plants based on Natural Gas will improve economic efficiency for new projects as well as available infrastructure and the refinery in terms of scale, deep processing level and world-class competitiveness.

**Thank you for
your attention!**

