ERTC VIRTUAL

CEPSA

REFINING AND PETROCHEMICALS INTEGRATION IN CEPSA: A CASE OF SUCCESS AND A STRATEGIC NECESSITY FOR THE FUTURE

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Refining and Petrochemical Integration: a key driver to win in a changing industry.

CEPSA OVERVIEW

Ref. & Petchem Integration

PETROCHEMICAL MARKET OVERVIEW & REASONS FOR INTEGRATING REFINING AND PETROCHEMICAL ASSETS

EXAMPLES OF SUCESSFUL REFINING & PETROCHEMICALS INTEGRATION IN CEPSA

THE ROLE THAT INTEGRATED ASSETS COULD PLAY IN MAXIMIZING SUSTAINABLE PROJECTS PROFITABILITY

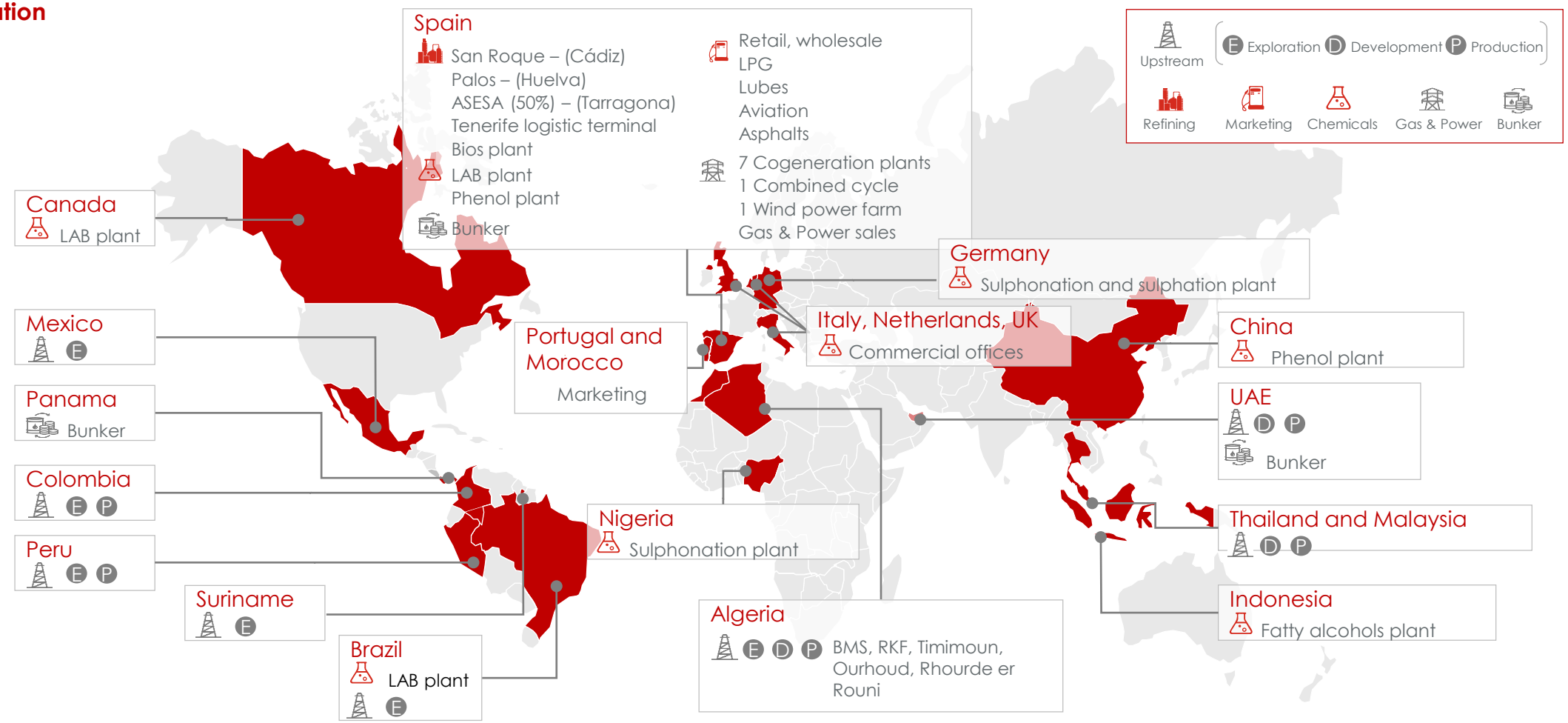
Q&A

The key for survival in a challenging environment now more than ever can be integration cross the entire length of the chemical value chain. This means integration with feedstock sources or refineries to maximize benefits.

CEPSA OVERVIEW

Assets Maximization

Cepsa is a global and fully integrated Oil & Gas company, owned by Mubadala (63% stake) and Carlyle Group (37% stake) and headquartered in Madrid.



CEPSA OVERVIEW

Refining Business:

Main activities

- The activity at the refineries enables Cepsa to convert crude oil into derivatives.
- Current crude distillation capacity is 23.6 Mty, 32% of installed capacity in Spain.
- Fully integrated with CEPSA QUIMICA petrochemical plants, as refineries supply main raw materials for the PetChem business (kerosene, benzene and propylene).

Assets description

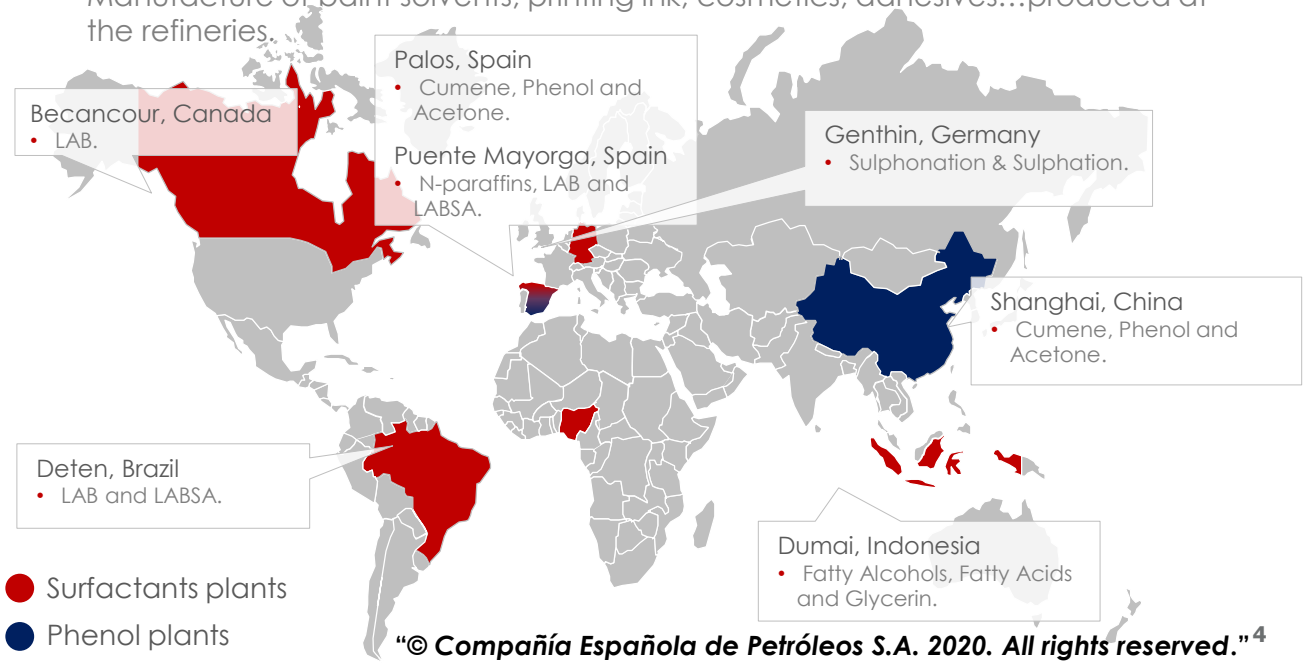
Gibraltar San Roque Refinery (RGSR) — 12.6 Mty Capacity

La Rábida Refinery (RLR) — 11.0 Mty Capacity

Petrochemical Business:

Business lines

1. Surfactants:
   - LAB: raw material for household detergents. Facilities in Spain, Canada and Brazil.
   - Alcohols: raw material for household detergents and personal care products. Fatty alcohols plant in Indonesia.
2. Phenol & acetone:
   - Raw material for engineering plastics. Facilities in Spain and China.
3. Solvents
   - Manufacture of paint solvents, printing ink, cosmetics, adhesives…produced at the refineries.

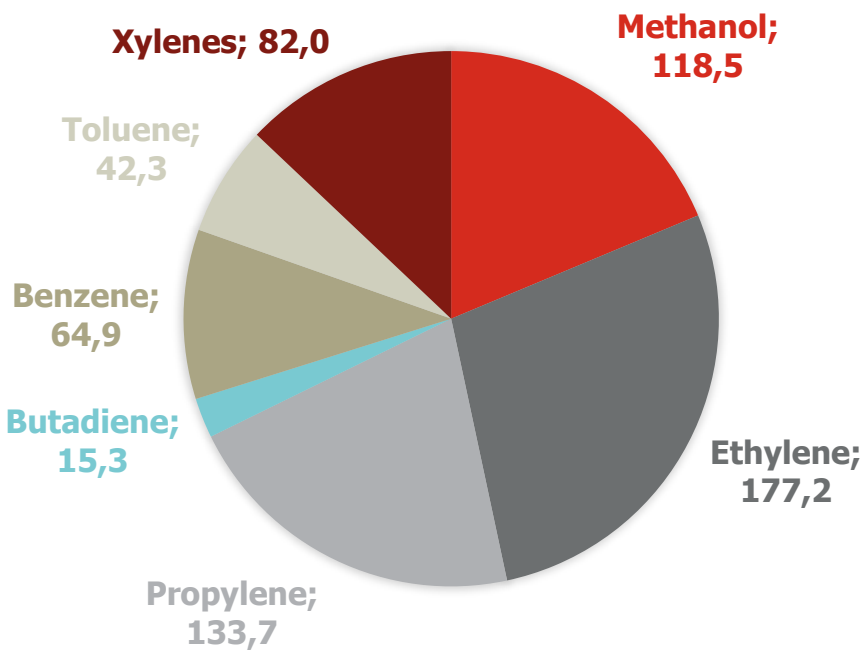


PETROCHEMICAL MARKET OVERVIEW. REASONS FOR INTEGRATING REFINING & PETROCHEMICAL ASSETS.

Petrochemical Business Cycle.

- The petrochemical industry is **typically cyclical** with the equilibrium between supply and demand driving the state of the industry.

GLOBAL CAPACITY FOR PETROCHEMICAL PRODUCTS (MTY)



Petrochemicals demand linked to GDP growth, especially in the emerging areas. World GDP mainly to grow in Africa, Middle East and Asia.

Natural Gas is the leading petrochemical feedstock consumed in the world (61%), followed by **naphtha** (27%) and **NGL** (9%).

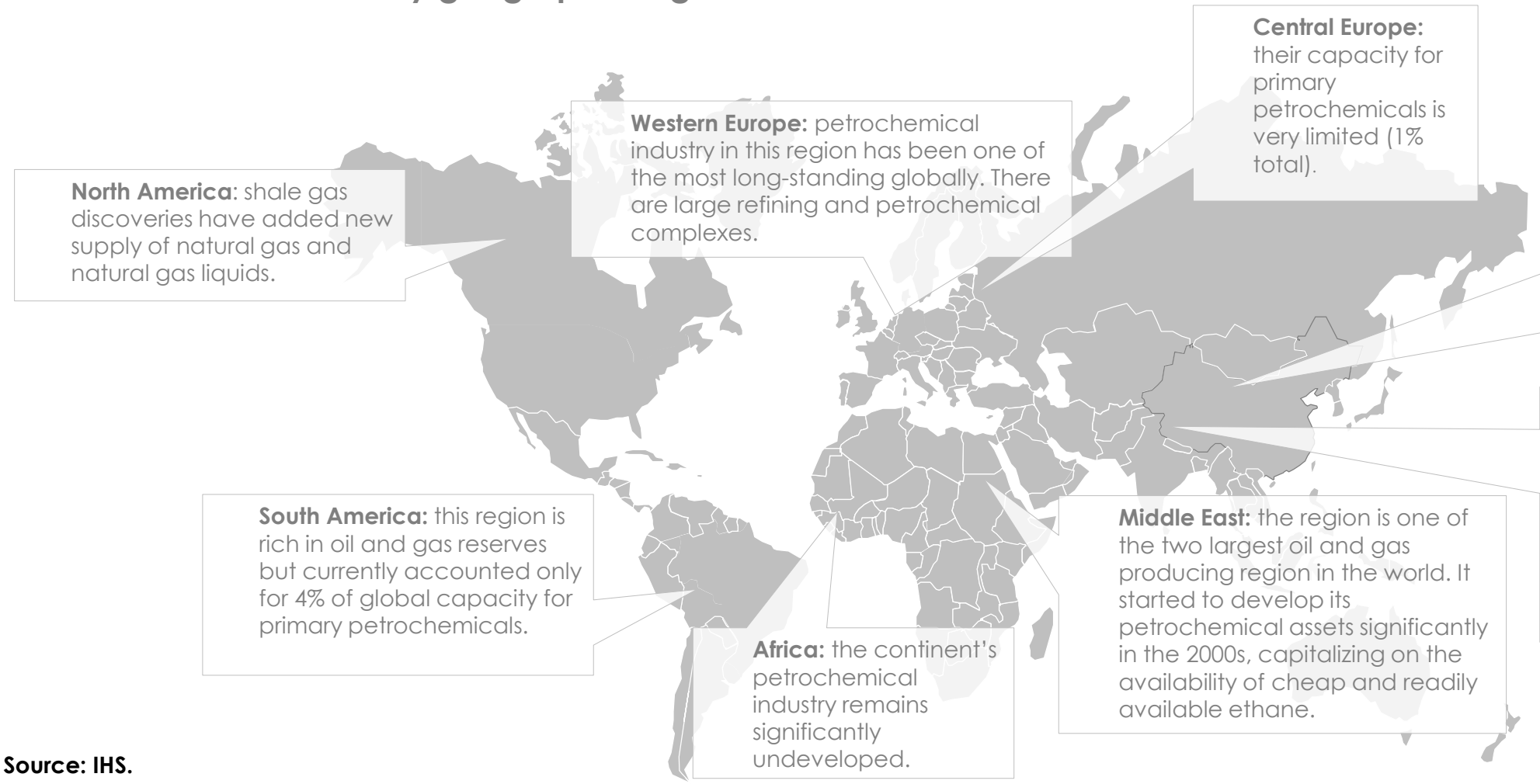
Major consumers are **North America**, **Northeast Asia** and **Middle East**.

The future of oil is in chemicals, not in fuels: refineries are facing in Europe flat or declining market demand. In contrast, petrochemicals market demand continues to rise worldwide – driven by demographic and economic reasons and consumption trends patterns.

Source: IHS.

PETROCHEMICAL MARKET OVERVIEW. REASONS FOR INTEGRATING REFINING & PETROCHEMICAL ASSETS.

Petrochemical trends by geographic region.



North America: shale gas discoveries have added new supply of natural gas and natural gas liquids.

Western Europe: petrochemical industry in this region has been one of the most long-standing globally. There are large refining and petrochemical complexes.

Central Europe: their capacity for primary petrochemicals is very limited (1% total).

Asia: the region has become the world's largest producer and consumer of petrochemicals.

China has put emphasis on its coal-chemicals industry.

Indian subcontinent: the petrochemical industry is heavily dominated by India. Despite the lack of ample feedstock, the region has a massive potential for the further development of its chemical polymers market.

South America: this region is rich in oil and gas reserves but currently accounted only for 4% of global capacity for primary petrochemicals.

Africa: the continent's petrochemical industry remains significantly undeveloped.

Middle East: the region is one of the two largest oil and gas producing region in the world. It started to develop its petrochemical assets significantly in the 2000s, capitalizing on the availability of cheap and readily available ethane.

Source: IHS.

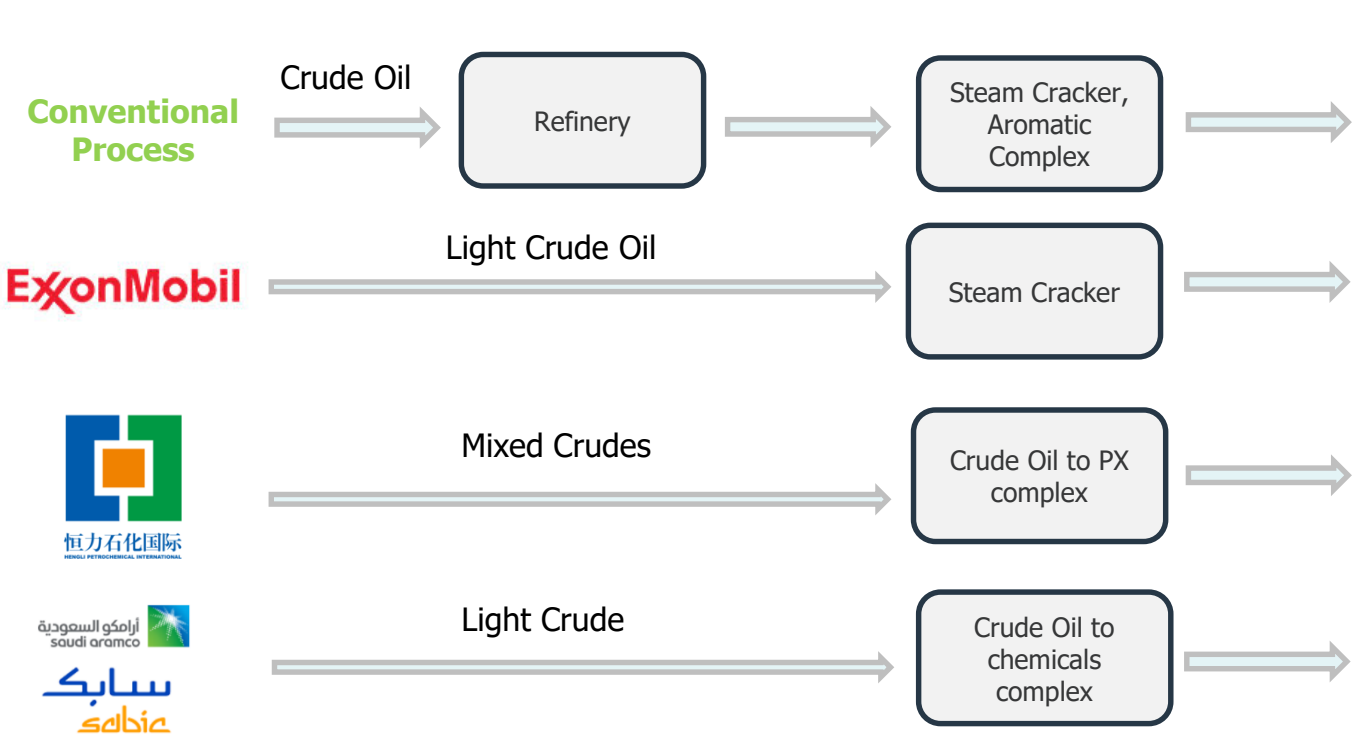
PETROCHEMICAL MARKET OVERVIEW. REASONS FOR INTEGRATING REFINING & PETROCHEMICAL ASSETS.

Ref. & Petchem Integration

Crude Oil-to-Chemicals (COTC) technology offers a path to greater refining profitability by converting crude to higher value chemicals, with a scale that would disrupt the global chemical industry. This concept elevates petrochemical production to refinery scale.

(from IHS "Crude Oil-to-Chemicals")

Crude Oil-to-Chemicals (COTC) production scheme:



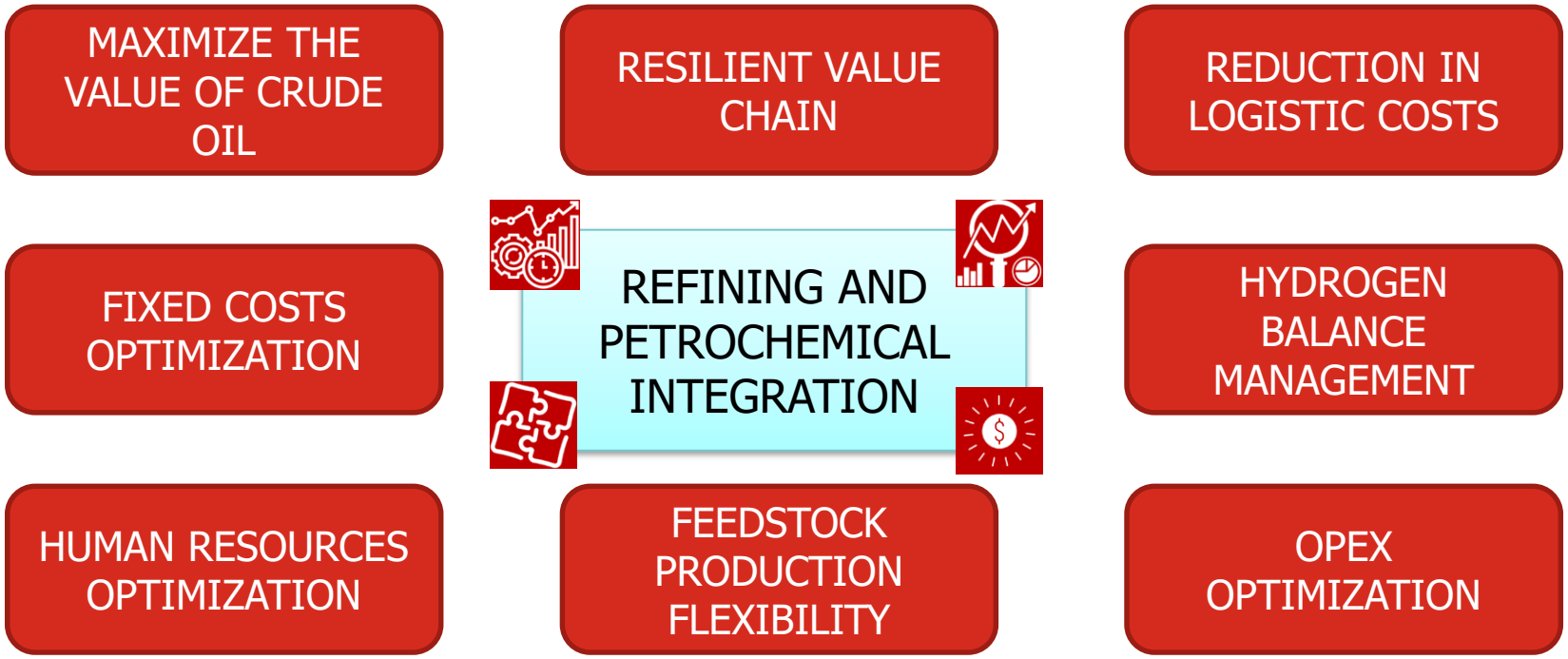
Crude Oil to Chemical complexes

- Conversion of the barrel can reach up to 45%.
- Very expensive, only affordable for big Oil and Gas majors

PETROCHEMICAL MARKET OVERVIEW. REASONS FOR INTEGRATING REFINING & PETROCHEMICAL ASSETS.

Ref. & Petchem Integration

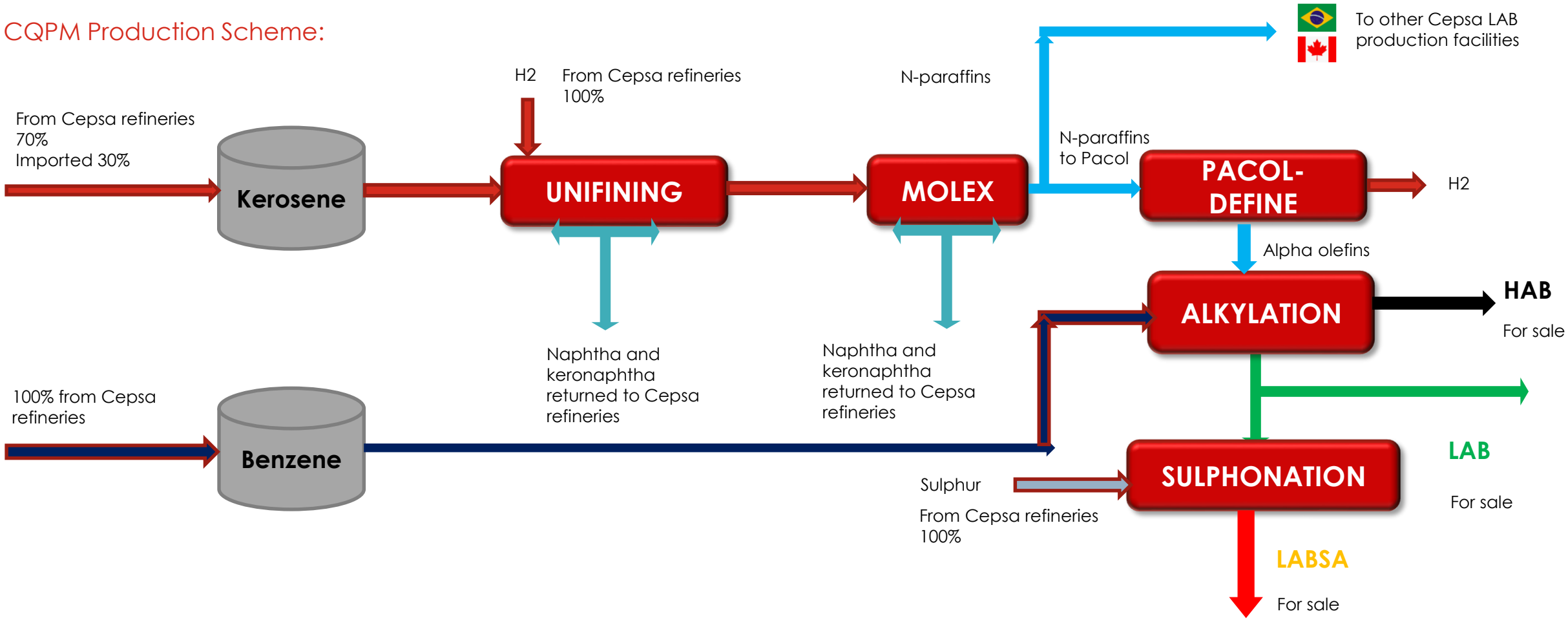
Small and medium sized Oil& Gas companies can take some initiatives to improve integration between their assets. Main Refinery and Petrochemical Integration drivers are:



EXAMPLES OF SUCESSFUL REFINING & PETROCHEMICALS INTEGRATION IN CEPSA.
EXAMPLES IN THE LAB VALUE CHAIN:

*CEPSA QUIMICA is the world leader in the production of linear alkylbenzene **(LAB)**, the essential material in the production of the most widely used surfactants for biodegradable detergents.*

CQPM Production Scheme:



EXAMPLES OF SUCESSFUL REFINING & PETROCHEMICALS INTEGRATION IN CEPSA.
EXAMPLES IN THE LAB VALUE CHAIN:

Main items of integration in the LAB value chain:

RAW MATERIALS AND UTILITIES SUPPLY

Around 70% of kerosene and 100% of benzene consumed in CQPM is produced in-house.

KEROSENE QUALITY PRODUCED AD-HOC

Kerosene cut is adjusted in Cepsa's refineries to minimize light-ends in the LAB manufacturing process.

BY-PRODUCTS RETURNED TO THE REFINERY

By-products of the process such as naphtha, keronaphtha and raffinate are returned and valorized in Cepsa's RGSR refinery.

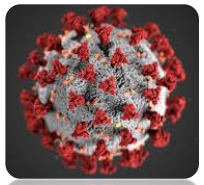
FLEXIBILITY AND COOPERATION

The role of Refining & Petrochemical integration in the LAB business during the Covid-19 pandemic is a clear example of success.

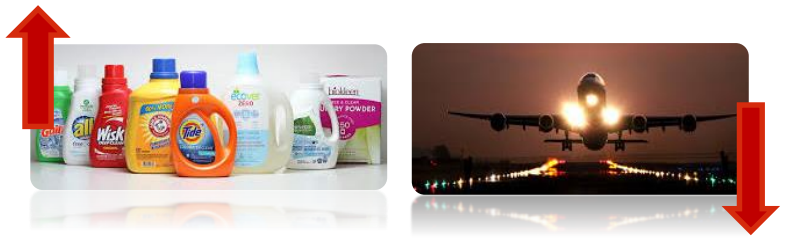
EXAMPLES OF SUCESSFUL REFINING & PETROCHEMICALS INTEGRATION IN CEPSA.
EXAMPLES IN THE LAB VALUE CHAIN:

The role of Refining and Petrochemicals integration in the LAB business during the Covid-19 pandemic, a clear example of success:

WHEN? During Covid-19 pandemic.



WHAT? Demand for surfactants was extremely high. Demand for Jet, used as aviation fuel plummeted.



WHO? Refining and Petrochemical business units. → FLEXIBILITY AND COOPERATION

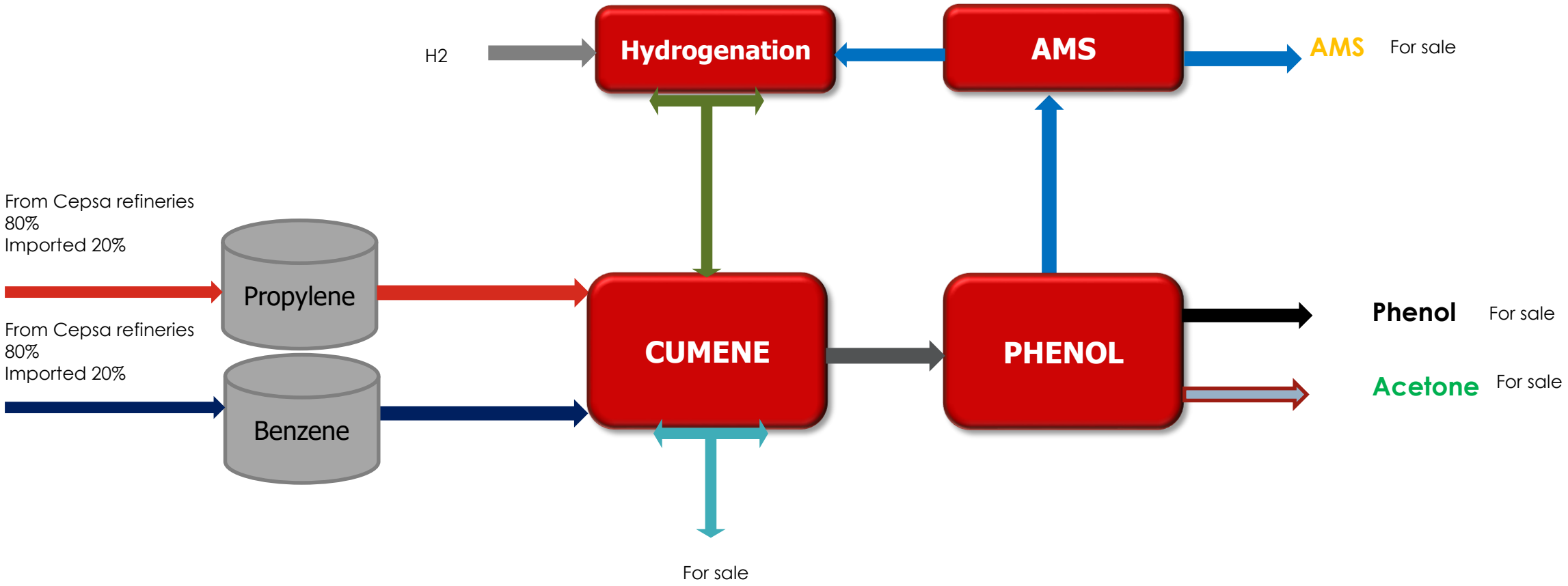
SOLUTION: Maximizing raffinate to alternative destinations:

- GoA: limited by cetane index.
- GoB: limited by cetane index.
- GoC: limited by distillation.
- MGO: up to 20% to meet distillation.

EXAMPLES OF SUCESSFUL REFINING & PETROCHEMICALS INTEGRATION IN CEPSA.
EXAMPLES IN THE PHENOL VALUE CHAIN:

*CEPSA QUIMICA is the world leader in the production of **cumene** and the second largest **phenol** manufacturer.*

CQP Production Scheme:



EXAMPLES OF SUCESSFUL REFINING & PETROCHEMICALS INTEGRATION IN CEPSA.

EXAMPLES IN THE PHENOL VALUE CHAIN:

Main items of integration in the Phenol value chain:

RAW MATERIALS AND UTILITIES SUPPLY

Around 80% of benzene and propylene consumed in CQP are produced in Cepsa's refineries located as well in the south of Spain.

SECURITY OF SUPPLY

Reducing the dependency of imports from third-parties provides flexibility to the system and avoids break of stocks in raw materials supply.

BY-PRODUCTS RETURNED TO THE REFINERY

By-products such as tar and CHE are returned to La Rábida Refinery to be valorized.

OPTIMIZATION PROJECTS

Projects to maximize olefins and aromatics are boosted.

FLEXIBILITY

The process scheme shows a high degree of flexibility, that will be explained in the following slide.

EXAMPLES OF SUCESSFUL REFINING & PETROCHEMICALS INTEGRATION IN CEPSA. EXAMPLES IN THE PHENOL VALUE CHAIN:

Some successful examples of Refining and Petrochemical integration in the phenol value chain:

FLEXIBILITY:

Depending on the economics, raw materials (propylene and benzene), intermediate product (cumene) or final products (phenol and acetone) could be sold in the market.

PROPYLENE vs. PROPANE SEPARATION:

Propylene sent from CEPSA's refineries to CQP has a purity of 85%. In CQP, propylene is splitted from propane, which is returned to the refinery to be commercialized. This mode reduces operational costs.

BYPRODUCTS VALORIZED IN LA RÁBIDA REFINERY:

Benzene Drag and Cumene Heavy Ends are by-products of the cumene manufacturing that are valorized in the refinery.

EXAMPLES OF SUCESSFUL REFINING & PETROCHEMICALS INTEGRATION IN CEPSA.

EXAMPLES IN THE SOLVENTS VALUE CHAIN:

*CEPSA QUIMICA commercializes **solvents** produced in both CEPSA's refineries and CQPM LAB plant.*

- *Aromatics: toluene, mixed-xylenes, white spirit …*
- *Aliphatic: hexane, heptane, …*
- *De-aromatized: D-40, D-60, D-100 and D-120.*

Main items of integration in the solvents value chain:

PRODUCTION vs. COMMERCIALIZATION

This requires a high level of cooperation between both areas to be able to supply product to the customers in time and form.

REGULATORY FRAMEWORK

Solvent business is facing strict regulations, especially in Europe. The cooperation between CQ's Research & Technical Assistance area and the production area in the refinery is key for succeeding in adapting the product portfolio to the market demand and regulations.

EXAMPLES OF SUCESSFUL REFINING & PETROCHEMICALS INTEGRATION IN CEPSA.
EXAMPLES IN THE SOLVENTS VALUE CHAIN:

Some successful examples of Refining and Petrochemical integration in the solvents value chain:

WHITE SPIRIT PRODUCTION:

White Spirit is produced using desulphurized keronaphtha. Keronaphtha from CQPM is normally used to meet customers' demand. But this amount is variable, depending on kerosene quality. For this reason, CQ works in cooperation with Refining to be able to meet the demand using some other units in Gibraltar-San Roque refinery to manufacture this product.

WIDE PORTFOLIO OF PRODUCTS:

Due to Refining and Petrochemical Integration, CQ can commercialize a wide portfolio of products, loading all of them at the same time and from the same production facility. This fact reduces logistic costs and provides great flexibility to the customer.

EXAMPLES OF SUCESSFUL REFINING & PETROCHEMICALS INTEGRATION IN CEPSA. THE PROJECTS TO COME:

CEPSA considers integration between Refining and Petrochemicals assets a must.

EVALUATING PROJECTS AS IF BEING A SOLE BUSINESS

WORKING ON INTEGRATING EXISTING ASSETS

WORKING ON MAXIMIZING RAW MATERIALS FOR PETCHEM PRODUCTION

THE ROLE THAT INTEGRATED ASSETS COULD PLAY IN MAXIMIZING SUSTAINABLE PROJECTS PROFITABILITY.

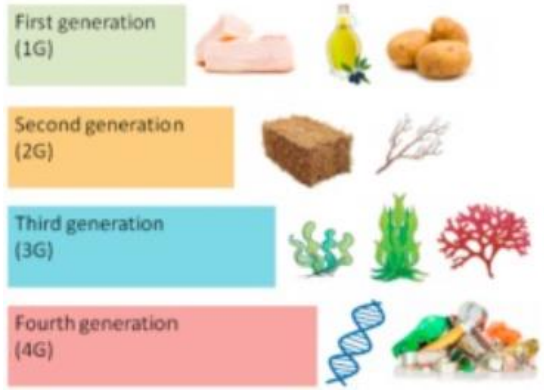
Refining and Petrochemical Integration will play a role in making profitable the so called "green projects" due mainly to:

ECONOMY OF SCALE

Operational Efficiency

Circular Economy

EASIER PROCESSABILITY OF WASTE AS RAW MATERIAL



Processability of more sustainable raw materials

THANK YOU FOR YOUR TIME AND ATTENTION

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Q&A

Ice-breaker questions:

1. Do you consider Refining and Petrochemical Integration key for the survival of the downstream business in Oil & Gas companies? Why?
2. Which technologies are going to lead the integration between Refining and Petrochemical assets?
3. Do you think that Refining and Petrochemical Integration is going to play a role in boosting "green projects"?