ITU MUN

OPEC

STUDY GUIDE

- Stabilisation of The Oil Market
- Improving production safety standards in order to ensure Safe Process for manufacturers

Mehmet Polat
President Chair

Hasan Qahtan
Deputy Chair

Letter from the Secretary-General

Most esteemed participants of ITUMUN24,

I, as the Secretary General of ITUMUN24, welcome you all to the 7th edition of Istanbul Technical University Model United Nations. It is an honor and a pleasure to be able to present to you what we have been preparing for months and dreaming for years. My team has worked tirelessly to bring the best you have ever seen, starting with our organization to our academics.

Our objective is to facilitate proficient and elevated diplomatic deliberations, fostering valuable and constructive solutions throughout the four-day duration of ITUMUN, enriched by the collective contributions of all participants. As a delegate, your journey begins here, with the study guide prepared by our dedicated members; your most honorable chairboard.

I advise you to read this study guide thoroughly and expand your research on different perspectives; focusing on your allocated country. It is essential to bear in mind that each nation and every perspective holds significance if you are adequately prepared to engage with the agenda at hand.

You have my best wishes for success and enriching discussions during these four days of enjoyment. I eagerly anticipate witnessing the valuable contributions you'll make to our conference.

Best regards,

Zehra Akçay

Secretary General of ITUMUN24

Letter from the Committee Board

Dear Esteemed Delegates,

I trust this letter finds you in good health and high spirits. As we delve into the heart of our shared mission within the OPEC+ Committee, I am pleased to extend warm greetings to each delegate. Your dedication and commitment to the committee's objectives have not gone unnoticed, and I express my heartfelt appreciation to each of you.

As we reflect on our collective journey so far, it is evident that our collaborative efforts have significantly contributed to the stability and sustainability of the global energy market. The OPEC+ Committee stands as a beacon of international cooperation, demonstrating the power of unity in addressing complex challenges.

I wish to acknowledge the invaluable contributions of our fellow board members. Your expertise, insights, and tireless efforts have played a pivotal role in shaping the committee's strategies and actions. Together, we have navigated through uncertainties and celebrated milestones, reinforcing the strength of our collaborative approach.

Now, as we look ahead to our upcoming sessions, it is crucial to reiterate our commitment to fostering dialogue and seeking consensus on matters of utmost importance. The OPEC+ Committee is poised to address the dynamic landscape of the energy sector, and your active participation remains fundamental to our success.

The expected outcomes of our committee sessions are multifaceted. We aim to formulate policies that not only ensure market stability but also promote sustainable practices in the production and distribution of energy resources. Through constructive discussions, we aspire to strike a balance that benefits both producing and consuming nations, fostering a resilient and equitable global energy ecosystem.

Furthermore, I encourage each delegate to actively engage in the deliberations, sharing perspectives, proposing innovative solutions, and embracing the spirit of compromise when necessary. Our diversity of thought is our greatest strength, and it is through open dialogue that we can achieve resolutions that stand the test of time.

In conclusion, I am confident that our collaborative efforts will continue to yield positive outcomes for the benefit of all member nations. Let us approach the upcoming sessions with enthusiasm, a spirit of cooperation, and a shared commitment to the ideals of the OPEC+ Committee. Thank you for your unwavering dedication, and I look forward to our continued success.

Warm regards,

Mehmet Polat

Hasan Qahtan

ITU MUN

Committee Introduction

In the pursuit of stabilizing the global oil market, the OPEC+ Committee is set to delve into two paramount agenda items: "Improving Production Safety Standards" and "Ensuring Safe Processes for Manufacturers."

"Improving Production Safety Standards" encapsulates our commitment to meticulously scrutinize and elevate safety protocols within the oil extraction and production processes. As we navigate this agenda item, we aim to fortify the industry against potential risks and hazards. By fostering a culture of safety, we not only protect the workforce involved but also safeguard the environment from potential adverse impacts associated with oil production.

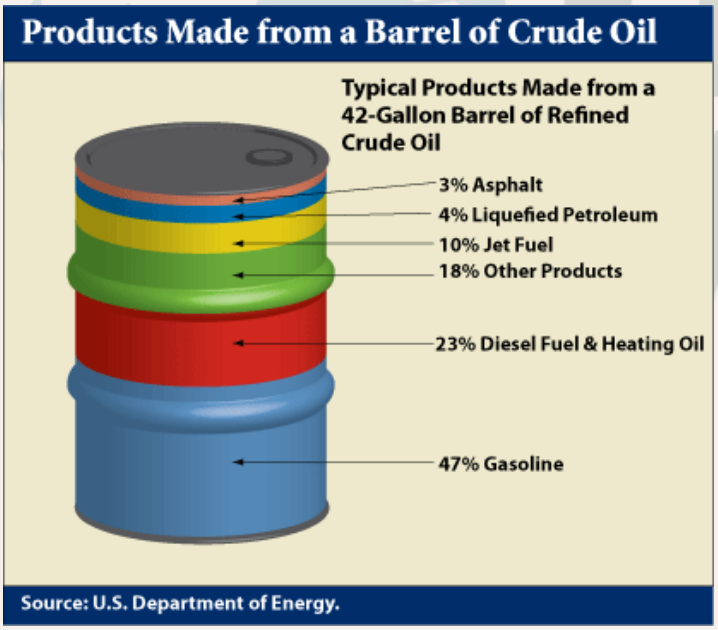
Simultaneously, "Ensuring Safe Processes for Manufacturers" underscores the necessity of a secure and resilient oil supply chain. From transportation logistics to refining procedures, our committee will explore comprehensive measures to establish a robust framework that guarantees the safety and integrity of each phase in the oil production cycle. The overarching goal is to enhance the industry's adaptability, making it more resistant to disruptions and challenges.

Throughout our deliberations, the committee will scrutinize existing safety standards and processes, identifying gaps and proposing innovative solutions to address them. As we collectively navigate the intricate web of issues surrounding the oil market, our discussions are geared towards formulating strategies that stabilize and sustain the industry.

The success of our efforts will not only impact the economies of member nations but also resonate globally, influencing the trajectory of the energy landscape. By focusing on these key agenda items, the OPEC+ Committee aims to contribute meaningfully to the establishment of a safer, more resilient, and stable oil market.

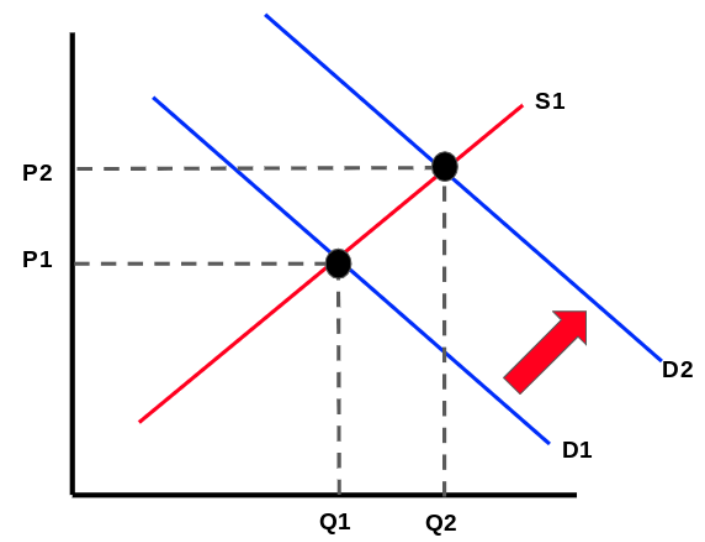
1. Agenda 1 (Stabilization of The Oil Market)

Oil, as a commodity, is used in several sectors for different purposes. gasoline, distillates such as diesel fuel and heating oil, jet fuel, petrochemical feedstocks, waxes, lubricating oils, and asphalt are some that can be mentioned. With that being said, we can see that the price of oil will cause an increase in cost function since the average total cost will rise. In economics, the cost function is determined by the addition of Variable Cost and Fixed cost. If the average variable cost increases (ceteris paribus), the production cost, as well as the price of the goods, will increase. If not, that means the producer will cut their profits. Other than that, since the oil market is considered an oligopoly, companies are not independent. They are interdependent on each other. Meaning, that if companies are not acting according to John Nash's Game Theory, they mandatorily leave some potential profit on the table.



Oil prices are fundamentally determined by global supply and demand. However, the supply of oil is controlled by a cartel of oil-producing countries called OPEC. In an open market, if the supply curve stays constant and the demand curve shifts right, the price will increase.

Supply and Demand Factor in Oil Market

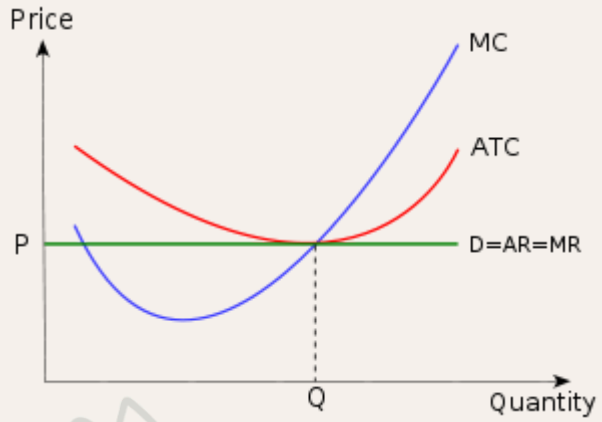


In the short run, an increase in demand will cause an oil shortage. The market will regulate itself with rising prices. However, vice versa will happen. If the demand curve of oil shifts right (meaning a decrease in demand), it will cause a surplus of oil and the oil prices will fall.

In current circumstances (high interest rates are applied to slow down inflation)[1], companies try to shift inflationary accounting. If not, in their balance sheet, their nominal profitability will deceive their investors. Other than that, in high inflationary eras, keeping prices profitable and attractive for consumers is a challenging task for companies. Since the oil market for personal use (such as gasoline, fuel etc.) is an oligopoly and perfect competition[2], they are not price makers they are price takers. So, their profit margin is determined, and they cannot change it if they cannot come up with a revolutionary product. The mentioned companies' economic profit is zero. Fundamentally this means that their derivative of total cost and derivative of total revenue equal. But it's important to say that here is still profit in accounting terms.

[1] This is provided because of Fisher Effect. According to Fisher, (1+nominal interest rate)=(1+real interest rate)*(1+inflation rate). So if a country wants to stabilize their inflation, they may try to raise their nominal interest rates to decrease the inflation.

[2] Perfect competition is usually used for a sector that entrance is free, and the sellers are price takers. However, it won't be a complete wrong determination to call oil distributors are *likely* in a perfect competition.



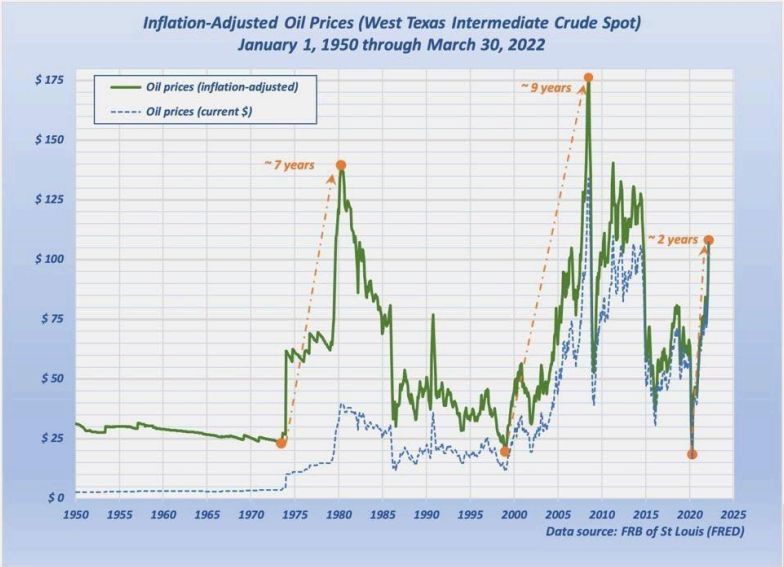
MC= Marginal Cost ATC= Average Total Cost, D=Demand

In short run, we can say that MC curve is derived from supply curve. So in this graph there is no need to add the supply curve. Marginal cost is the cost added by producing one additional unit of a product or service. In our situation, we can calculate as producing one additional unit of oil. If marginal cost is higher than the potential revenue, that means there is no need to produce more oil. Other than that, when ATC is higher than the price, the company will shut down its activities because there is no profit, hence there is economic loss. In these kinds of situations governments will act to stabilize the market. For example, they may lower the taxes to increase the consumption or lower the average variable cost.

Crude oil is used in various sectors. That makes the commodity more stable than its competitors. For example, if a commodity is used in just one sector and that specific sector has found a substitute that is cheaper, more efficient, and easier to transport goods, automatically the price and the demand of that specific good will decrease. However, if a commodity is used in different sectors, it will be harder to be substituted. For example, if a company uses oil as their power source and they find X good as an alternative to oil, they have to sell or replace their machinery and order new ones to produce energy. This will cost both time and efficiency. However, in the long term, if X good is more efficient than oil, the company will not hesitate to change its direction. In economics, the decision-makers are not polarized, meaning they are not tied up with just one option in the economy. In a free market, companies are required to maximize their profit. If you cannot expand the usage of a certain good (shifting demand to left ceteris paribus increases the price and profit), you have to minimize the cost.

In economics, we consider data in two sections, the first one is nominal and the second one is real. The nominal term is the price in fiat money terms. The real is corrected by inflation (better explained with the Consumer Price Index). Economists are interested in real returns because if a currency' supply is not fixed to a limited-supplied commodity, it

automatically has an infinite amount of supply. Hence, the value of the dollar by PPP[3] will decrease over time (the supply of money will shift to the left and will decrease in price)[4].



From this point of view, thinking that moving back to the gold standard or a finite-supplied commodity will be beneficial for stabilizing the oil market. However, since oil has a finite supply, this will just stabilize the nominal price of the oil, not the real part. Do not forget that nominal prices are like honeymoon, it looks too good to be true and usually it is not.

So, we consider that nominal prices are not as important as it sound. The most important factor that we have to look for is real prices and the real market. Just to give a clearer example, imagine X good is bought by a company for 100$ and imagine that the ex-ante[5] inflation is 100%. If the company sold this good for below 200$, they cannot even compensate the cost of raw material. In the oil market, if uncertainty is so high, the prices must be volatile according to the dependent currency and inflation.

The exchange rate is a key term in the oil market. Oil is not a commodity that every country can produce. Most of the countries are oil importers. With that being said, let us compare the oil price in Turkey and TRY/USD parity.

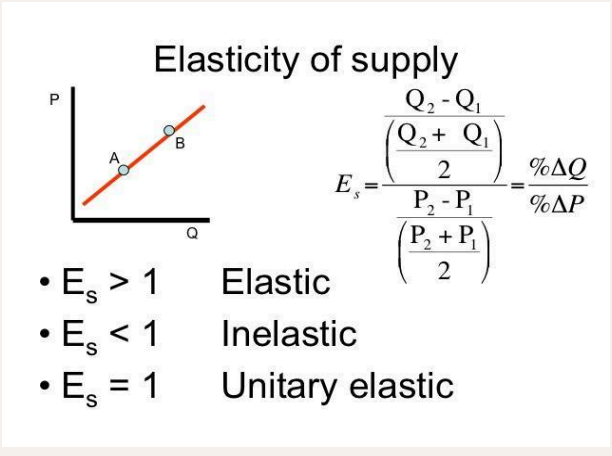
[3] PPP: Purchasing Power Parity
[4] In here, imagining decrease in price will sound absurd because we are discussing the value of the dollar. However, if we assume the fiat Money as a good, we can definitely discuss its value against either other currencies or against other goods.
[5] Ex ante is usually mentions in interest rate topic. However, we can use here as “expected”.

This is the graph of UKOIL relative to US dollars. As seen, from 2020 April, it appreciated by 600%.

This is the graph of UKOIL relative to TRYUSD parity. As you may see, from 2020 April, it appreciated by 2200%

Here, we can see that the exchange rate related to reserve currencies like the US Dollar will affect the nominal price of the commodities (in our example it is oil.). However, if you are the importer of a specific, finite supplied commodity, we have to consider the exporter countries. However, accepting the US Dollar as cartesian will make us obtain a better general look at the economy.

Elasticity



As mentioned before, if a commodities' supply is controlled by a cartel, we will expect that the supply is inelastic. Elasticity is determined by % change in quantity supplied / % change in price.

If the % change in quantity supplied / % change in price is greater than 1, that means supply is elastic. If it is less than 1, that means supply is inelastic. Unit elasticity is a concept that we never come across in economics.

Elasticity is the response of the demand and supply (in our example it is supply) to the change in price. It may seem too mathematical at first glance however, we can say that if a good is an integral part of daily life, the mentioned goods' demand is mostly inelastic. The number of substitutes is important in the elasticity topic too. For example, if the price of rice rises, households will switch to pasta in no time. Those two goods are not perfect substitutes for each other, but since they have similar purposes, households will not be hesitant to change their spending habits. Other than that, changing oil to another power source will be quite hard due to the fact that most cars, public transportation vehicles, ships, and planes use products of petroleum as their primary power source. As imagined, they cannot change their all machinery in just one day because oil appreciated 10%.

Inelastic demand leads to government intervention in the free market. In economics, less government intervention is better due to the belief that the free market will regulate itself in the long run and create a new equilibrium. However, in some cartel sectors like oil and gas, governments must intervene in the market. If not, oligopoly companies will set the prices at non-affordable levels. As I mentioned before, in oligopoly markets, companies are not independent, they are interdependent. So, if they want to maximize their profits, they have to act like a monopoly. If they do, it will kill the beauty of the competitive market. Here, governments are eager to intervene in the market because their priority should be the accessibility of goods among their citizens and ensuring the companies are constantly making profit. If one of those aims fails, we cannot reach any equilibrium in the economy, there will be either a shortage or a surplus.

In oil market stabilization, technology is an integral factor too. If we somehow manage to figure out a more efficient way to produce oil, the oil prices will automatically drop. As mentioned before, the cost factor is the most important in the price determination process. Let us imagine that companies found a more efficient way to produce or transport oil. This will directly affect the price and lead to cheaper products. When one company lowers their prices, other companies are forced to do so. They may cut their profits to equalize the arbitrage between other companies or they are forced to buy the recent technology. Otherwise, the other companies will lose their market share and their profits significantly. With that being said, oil companies are spending billions of dollars on their research departments to increase their oil efficiency and production efficiency. Of course, that spending leads to higher costs and higher prices. But in the long run, if we want to develop technology, we have to go to those levels of capitalism.

Terminology

1. **OPEC+ Committee**: Organization of the Petroleum Exporting Countries (OPEC) and its allies, working together to manage oil production and stabilize the global oil market.

2. **Production Safety Standards**: Guidelines and measures aimed at ensuring the safety of oil extraction and production processes.

3**. Manufacturers' Safe Processes**: Procedures and protocols to guarantee the safety and integrity of oil supply chain processes, from transportation to refining.

4. **Cost Function**: The mathematical representation of the relationship between the cost of production and the level of output.

5. **Variable Cost**: Costs that vary with the level of production.

6**. Fixed Cost**: Costs that remain constant regardless of the level of production.

7. **Oligopoly**: Market structure characterized by a small number of large firms dominating the industry.

8. **John Nash's Game Theory**: A theory in economics that studies strategic interactions between rational decision-makers.

9. **Supply Curve**: A graphical representation of the relationship between the quantity of a good supplied and its price.

10. **Demand Curve**: A graphical representation of the relationship between the quantity of a good demanded and its price.

11. **Marginal Cost (MC):** The additional cost incurred by producing one more unit of a good or service.

12. **Average Total Cost (ATC):** The total cost per unit of output.

13. **Inflationary Accounting**: Accounting practices adjusted for the effects of inflation.

14. **Oligopoly and Perfect Competition**: Market structures where a few large firms dominate (oligopoly) or many small firms compete (perfect competition).

15. **Economic Profit**: Profit calculated by considering both explicit and implicit costs.

16. **Marginal Cost Curve**: A graphical representation showing the relationship between the quantity produced and the marginal cost.

17. **Elasticity**: A measure of the responsiveness of quantity demanded or supplied to a change in price.

18. **Inelastic Demand**: Demand that does not significantly change with a change in price.

19. **Unit Elasticity**: A situation where the percentage change in quantity supplied or demanded is exactly equal to the percentage change in price.

20. **Exchange Rate**: The value of one currency in terms of another currency.

21. **Nominal Price**: The price of a good or service in terms of money.

22. **Real Price**: The nominal price adjusted for inflation.

23. **Consumer Price Index (CPI):** A measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services.

24**. Gold Standard:** A monetary system where the value of a country's currency is directly tied to a specific quantity of gold.

25. **Cartel**: A group of producers or sellers that work together to control and influence prices in the market.

26. **Inelastic Supply**: Supply that does not significantly change with a change in price.

27. **Elastic Supply**: Supply that changes significantly with a change in price.

28. **Government Intervention**: Actions taken by the government to influence or control economic activities.

29. **Arbitrage**: The practice of exploiting price differences for the same asset in different markets.

Key Vocabulary:

Reservoir: The underground substructure where oil can accumulate in.

Oil Rig: Is a large structure used for the exploration and extraction of oil and gas from beneath the Earth's surface.

Hydrocarbons: A term used to describe both oil and gas because of their chemical structure, which consists of Hydrogen atoms and Carbon atoms.

British Petroleum (BP): A company of British origins that is specialized in oil production services.

Pipelines: Pipes of much length, used to transport hydrocarbons over very long distances.

Corrosion: A process where iron is damaged by external reactions by introducing humidity and oxygen.

Blowout Preventer (BOP): A device that is critical to the safety of the production process; it is used to control any uncontrolled release of oil or gas, and in case of any uncontrolled release the device shuts down the wellbore. It also controls the pressure of the well during drilling and production.

Wellbore: is the term used to describe the hole that is dug into the ground, also known as borehole or simply well.

2.1 Introduction:

The production of oil is a complex process that can be categorized in 3 categories:

1. Upstream

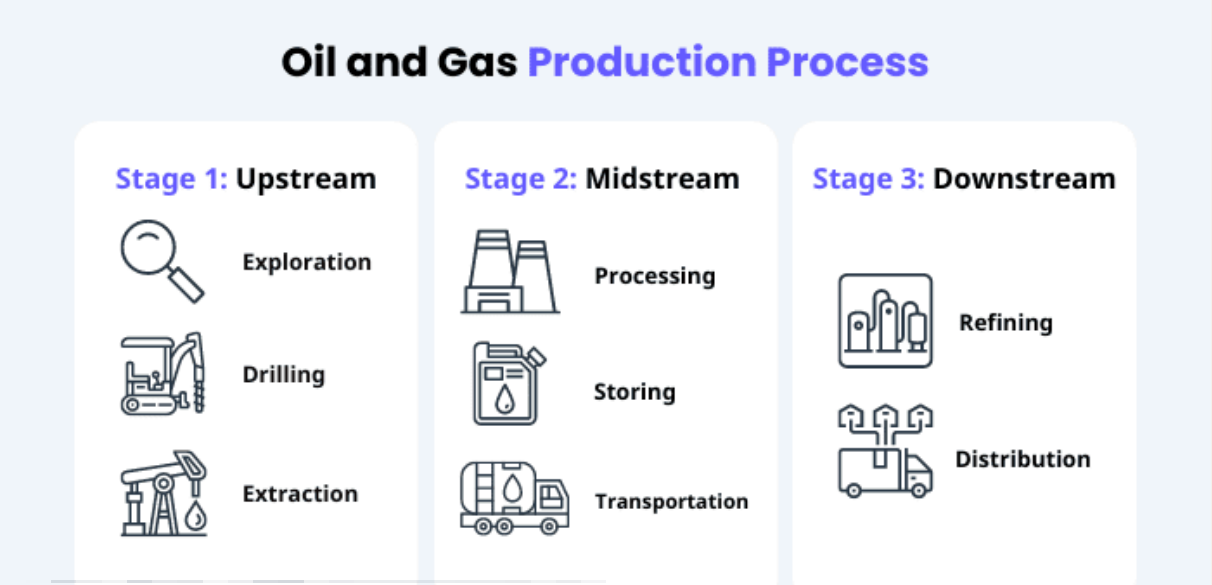
Upstream production focuses on the extracting of oil from a petroleum reservoir, where oil can be accumulated in for millions of years and can be at various depths underground that can reach up to tens of kilometers.

2. Midstream

Midstream production is the section that focuses on the storage and transportation of crude oil and gas in above-ground facilities.

3. Downstream

Downstream is the section that is concerned with refining the crude oil and gas into marketable products and then marketing them for sale.



2.2 Complications:

2.2.1 Upstream issues

Complications can arise in all sections and processes of production, as oil is highly contaminant to the environment and any mistake can lead to severe injuries and even death. Diving more in depth, the problems that can arise in Upstream can be while drilling and extracting. While drilling, many factors must be kept in such as the drill bit, drilling mud, mud pumps, drill pipe, the size of the well drilled, casing the well, cementing the well, maintaining conditions to not contaminate the reservoir etc... While extracting, the production of oil and gas has to be maintained as the hydrocarbons are in a very heated and pressurized environment and it can easily erupt to the surface causing spillages or even worse casualties. In off-shore drilling, the significance of handling everything is paramount for the conditions off-shore are much more dangerous and the equipment used there is affected by more factors.

2.2.2 Midstream issues:

The problems in midstream arise mainly from transportation, whether it is environmental or safety and security related. First, the understanding of how oil is transported has to be known. Simply, Oil and gas are mainly transported using pipelines that moves oil a very long distance. These pipelines might be introduced to external or internal factors that retard the transportation and endanger the whole process. Pipelines may be corroded from the inside by transporting crude oil that is not very pure, or oxidized from outside by humidity, rain, heat and other forces. Thus, environmentally, pipelines might leak hydrocarbons, spill or even combust under specific conditions and that does not only happen to pipelines, storage facilities of oil might also fall under the same risk. On the other hand, since these storage and transportation facilities are huge in size, and for pipelines they span to different countries, they are susceptible to theft, tampering, and even terrorization from individuals and organizations.

2.2.3 Downstream issues:

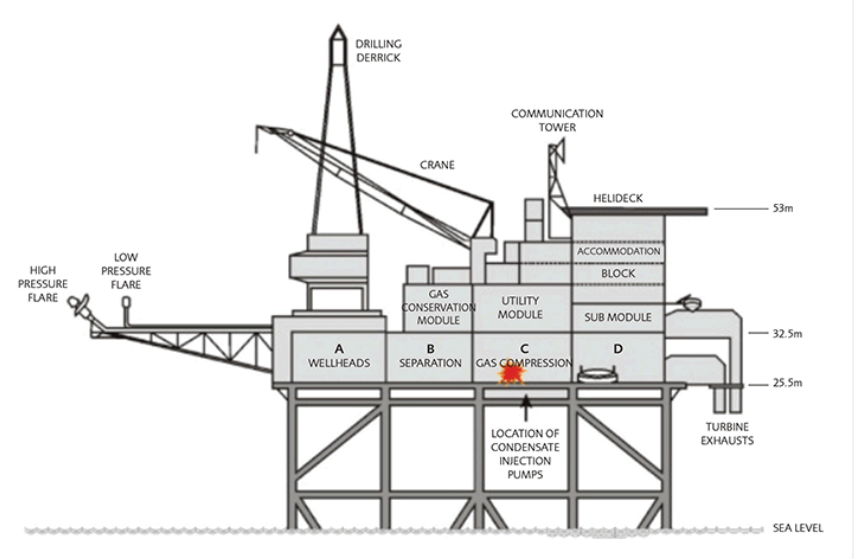
During the refining process extreme heat is applied to the crude oil to produce specific chemical substances that can be used by the public like gasoline, diesel, asphalt etc.. the application of high heat leads to problems of fire or explosions which needs to be shielded from for the safety of the workers and for economic reasons.

2.3 Previous Disasters During Production

2.3.1 The Piper Alpha Oil Rig:

The Piper Alpha disaster, occurring on July 6, 1988, in the North Sea, stands as one of the most catastrophic incidents in offshore oil rig history. The platform, initially designed for oil production, experienced a devastating explosion and subsequent fires due to a gas leak. Tragically, 167 lives were lost, prompting a profound reevaluation of offshore safety practices.

Piper Alpha was initially designed as an oil production platform but underwent modifications over time to incorporate gas compression facilities. On the day of the incident, Piper Alpha was in operation, processing oil and gas from various wells in the North Sea. The disaster was triggered by a



gas leak from a condensate pump. Specifically, two pumps were installed on the rig, pump A, and pump B. Pump B was active while the other pump was undergoing maintenance; Pump B had stopped working due to it being faulty and pump A had the safety valve removed. To not fully halt production, pump A was switched on without a safety valve. A series of events led to a catastrophic explosion and subsequent fires on the platform. Failures in safety systems, communication breakdowns, and inadequate emergency response contributed to the severity of the incident.

The Piper Alpha disaster had a profound impact on offshore safety regulations and practices worldwide. The Cullen Report led to the implementation of the Offshore Installation (Safety Case) Regulations 1992 in the UK. These regulations required operators to submit safety cases demonstrating how they would manage major accident hazards. The Piper Alpha disaster emphasized the importance of asset integrity and the need for rigorous inspection, maintenance, and testing of critical equipment to prevent catastrophic failures. The disaster highlighted the importance of effective communication and emergency response planning. Subsequent improvements included better communication systems, training for personnel, and regular emergency drills.

2.3.2 The Texas City Refinery

The Texas City Refinery explosion of 2005 was a significant industrial accident that occurred at the BP Texas City refinery, one of the largest refineries in the United States. This incident, which took place on March 23, resulted in multiple fatalities, numerous injuries, and extensive damage to the facility.

The incident began with the explosion of an isomerization unit, followed by subsequent fires in other parts of the refinery. The blast was felt miles away, and a thick plume of smoke rose into the air. Fifteen workers lost their lives in the explosion, and more than 170 others sustained injuries. Many of the victims were in or near trailers that served as temporary offices and were located close to the blast site. The explosion was attributed to the release of flammable hydrocarbons from a blowdown stack, which found an ignition source. The blowdown stack was used to relieve excess pressure during the startup of a unit. Investigations revealed a range of organizational and safety culture issues at the BP Texas City Refinery. These included deficiencies in process safety management, inadequate training, and a lack of communication between workers and management. Mechanical failures, such as the failure of safety systems and equipment, were identified as contributing factors. In particular, the blowdown stack was not properly maintained, and alarms and safety devices were not functioning correctly. The refinery's infrastructure was overcrowded with trailers serving as offices, leading to a higher concentration of personnel in vulnerable areas. The aging infrastructure also contributed to the difficulties in maintaining equipment reliability.

The Texas City Refinery explosion had a substantial impact on the oil and gas industry's approach to process safety management. The incident led to reforms and improvements in Process Safety Management (PSM) practices, emphasizing the need for rigorous inspection, maintenance, and risk assessment. The incident prompted a closer look at occupational safety standards, with an emphasis on preventing overcrowding in workplaces, improving communication, and ensuring the reliability of safety systems. The Texas City Refinery explosion served as a catalyst for the entire industry to reflect on the importance of maintaining a strong safety culture, investing in infrastructure integrity, and implementing effective process safety measures.

2.3.3 Deepwater Horizon

The Deepwater Horizon disaster was a catastrophic event that unfolded on April 20, 2010, when the offshore drilling rig Deepwater Horizon, operated by Transocean and leased by BP, suffered a blowout during exploratory drilling in the Macondo Prospect located in the Gulf of Mexico. The incident had severe consequences, both in terms of human lives lost and environmental damage, and it stands as one of the largest environmental disasters in the history of the oil and gas industry.

A blowout occurred during the final phases of drilling, causing a sudden release of high-pressure methane gas. The gas ignited, leading to a massive explosion and subsequent fire on the rig. Eleven crew members lost their lives in the initial explosion, and several others sustained injuries. The incident marked one of the deadliest offshore drilling accidents in recent history. The blowout preventer (BOP) system, designed to contain well blowouts, failed to operate as intended. This led to an uncontrolled release of oil and gas from the wellhead on the seafloor, creating an environmental disaster. Over an 87-day period, an estimated 4.9 million barrels (approximately 210 million gallons) of crude oil spilled into the Gulf of Mexico. The oil spread across a vast area, impacting marine life, coastal ecosystems, and local economies. The spill caused extensive damage to marine and coastal environments, affecting marine life, wildlife habitats, and tourism. It prompted one of the most extensive environmental response efforts in history.

The Deepwater Horizon explosion and the ensuing oil spill in the Gulf of Mexico prompted the United States to implement the most extensive and forceful reforms to offshore oil and gas regulation and oversight in its history. The reforms are making it possible for the US to develop its energy resources more responsibly and safely by tightening regulations on everything from workplace safety and well-designed buildings to corporate responsibility. Internal changes and a thorough restructure were implemented to eliminate the complex and occasionally contradictory aims of the former Minerals Management Service (MMS). The Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) was established as a stand-in organization for the previous MMS. On October 1, 2011, following an 18-month restructuring, the Bureau of Ocean Energy Management (BOEM), the Bureau of Safety and Environmental Enforcement (BSEE), and the Office of Natural Resources Revenue (ONRR) were established as three powerful, autonomous organizations with distinct responsibilities.

2.4 Current Production Safety Standards

2.4.1 The American Petroleum Institute

The American Petroleum Institute (API) develops and publishes industry standards that cover various aspects of the oil and natural gas industry. These standards are widely recognized and used globally, providing guidelines, specifications, and best practices to ensure safety, efficiency, and reliability in petroleum-related activities. API standards cover a broad range of topics within the oil and gas industry, including exploration, drilling, production, refining, and transportation. They address technical specifications, recommended practices, guidelines, and requirements. API standards are developed through a consensus-based process that involves industry experts, regulators, and other stakeholders. Technical committees and subcommittees are responsible for drafting and updating standards, and public input is often sought during the development process.

2.4.1.1 Example safety standards by API

1. API RP 2D - Operation and Maintenance of Offshore Cranes:

This recommended practice outlines the requirements for the operation and maintenance of offshore cranes used in the oil and gas industry.

2. API 510 - Pressure Vessel Inspection Code:

API 510 provides guidelines for the inspection, repair, alteration, and rerating of pressure vessels used in the petroleum and chemical process industries.

3. API 570 - Piping Inspection Code:

This standard addresses inspection, rating, repair, and alteration procedures for in-service piping systems.

4. API 650 - Welded Steel Tanks for Oil Storage:

API 650 specifies requirements for the design, fabrication, erection, and testing of welded steel tanks for storing oil and other liquids.

5. API 1104 - Welding of Pipelines and Related Facilities:

API 1104 outlines welding procedures and practices for the construction and maintenance of pipelines and related facilities.

6. API RP 75 - Safety and Environmental Management System for Offshore Operations and Assets:

This recommended practice provides guidelines for the development, implementation, and maintenance of safety and environmental management systems in offshore operations.

7. API RP 14C - Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms:

API RP 14C addresses the design and implementation of surface safety systems on offshore production platforms.

8. API Spec Q1 - Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry:

API Spec Q1 establishes the quality management system requirements for organizations involved in the manufacturing of petroleum and natural gas industry equipment.

2.4.2 Society of Petroleum Engineers

The Society of Petroleum Engineers (SPE) is a professional organization that focuses on the technical aspects of the petroleum industry, providing a platform for networking, knowledge sharing, and professional development among its members. Unlike regulatory bodies or international organizations, SPE does not have the authority to set or enforce safety regulations. However, it plays a crucial role in promoting best practices, technological advancements, and knowledge exchange within the industry.

Going more in depth of what the organization does, SPE publishes technical papers, journals, and magazines that cover a wide range of topics, including those related to health, safety, and

environment (HSE). These publications often feature case studies, research findings, and innovative solutions for addressing health, safety, and environmental challenges in oil and gas operations. Furthermore, Within SPE, there are specific technical committees and groups dedicated to HSE concerns. These committees bring together experts and professionals who focus on developing guidelines, best practices, and standards related to health, safety, and environmental considerations in the petroleum industry. SPE offers training courses, webinars, and educational resources focusing on HSE aspects. These programs aim to enhance the knowledge and skills of professionals working in the petroleum industry, promoting a culture of safety and environmental stewardship. Also, SPE plays a role in promoting technological innovations that contribute to improved HSE performance. This includes advancements in monitoring technologies, data analytics, and process improvements designed to enhance safety and environmental sustainability in oil and gas operations.

2.5 Questions to be answered

- How is Petroleum produced?
- What are the concerns while producing Petroleum?
- Why is this industry so controversial?
- What has been done about the safety of production?
- What are the limitations of the regulations put in place?
- How is it possible to increase safety in production?
- Where do most problems appear during the production process?
- Is it possible to fully prevent errors in production?
- How do API and SPE play a role in the safety of the production process?
- How can OPEC+ play a role in increasing the safety of the production process?

2.6 Bibliography

2023 API publications catalog. (2023). https://www.api.org/-/media/files/publications/2023_catalog/2023_api_publications_catalog.pdf

API RP 75. Inspectioneering. (n.d.-a). https://inspectioneering.com/tag/api+rp+75

API standards: International usage and deployment. (2022). https://www.api.org/-/media/apiwebsite/products-and-services/apiinternationalstandardsreport.pdf

Investigation report volume 1 - IADC.org. (2014). https://iadc.org/wp-content/uploads/2016/04/US-CHEMICAL-SAFETY-BOARD-DEEPWATER-HORIZON-REPORT-Vol_1_Final.pdf

OFFSHORE DRILLING SAFETY AND RESPONSE TECHNOLOGIES. (2011). https://www.govinfo.gov/content/pkg/CHRG-112hhrg65490/pdf/CHRG-112hhrg65490.pdf

What's new with API/ASME IN-service inspection standard. Inspectioneering. (n.d.-b). https://inspectioneering.com/content/2007-09-01/243/what-s-new-with-api-asme-in-se