Lesson hours: 8.30-10, 10-,15-11.45, 12-13.30 14.30-16, 16:15-17.45.

Attending students can do 3 tests at the end of each module, the average result of the tests will give points to the final grade (max 2) **Test 1: 10 oct (16.15) Test 2: 14 Nov (16.15) Test 3: Dec 10 (12)**

Written English exam, 6 questions, 2 for each module (reply to all the questions), Moodle page password: eees2018, use the references and use it during class

Module III: Environmental issues, problems of maximum level of pollution allowed, instruments to deal with pollution and international agreements on environment (Paris agreement),

Module II: Foundations of energy economics and energy market (supply and demand, Hydrocarbons primarily) how the economic theory explains di energy market, especially in the European countries. Strategies of the EU on energy policies, different models to describe and forecast agents in the market, and the main characteristics on the supply side (very far from perfect competition), Micro and Macroeconomics are important prerequisites.

Module I:

Introduction on energy: Oil six myths about it to debunk

First myth - oil is found in underground caves, and we only need to reach it and pump it up, but that's not the case: oil is extracted form layers of porous rock, not in cave, oil is scattered in tiny droplets and its very hard to find it, you must be skilled to understand from the surface that there are droplets down below, and still it's not easy to understand how much oil there effectively is and that's clearly relevant in term of investment.

Second myth - oil is homogeneous, oil is the same everywhere. That's not true, oil is very different considering the quality and obviously this effects the price, higher quality oil needs far more refinery and lesser production costs and better market. Oil becomes in fact homogeneous at the end of the refining process. The majority of high-quality oil is located in Arabian peninsula, the so called "light oil" that has less impurities and less refining process and that makes its price lower (of course it fluctuates depending on quantity)

Third myth - Oil is like "black Gold": not always, oil can be remunerative and not, today oil is around 70/80 us dollar per barrel, **a baller is 159 litres,** that means 1 liter is around 0,5 pretty cheap. Then why black gold: the world consumes 80 million barrels a day, the market is gigantic and the perspectives are still positive.

Fourth myth – who finds oil finds a treasure: not always true, ground conformations, environmental difficulties or poor oil quality con make a field exploitation expensive and not worth it (sand for example is easy to penetrate, oil in frozen tundra is not easily penetrated). All this has a cost added to the price per barrel and impact on the final price to the consumer (transport, taxes, ecc..). This can also make oil extraction in some areas less profitable and the price will levitate, but if I can predict that the global price of oil will rise in the next period then I could consider extracting oil even if it's expensive.

Fifth myth - The OPEC (organization of petroleum exporting countries) controls the oil market. This was true until the nineties: today the OPEC members control approximately the 40% of oil production, not like in the past (80%), the today OPEC'S political strength is less relevant than forty years before. Today other countries like the US, Mexico, Russia, Norway ecc can export a relevant amount of oil and that changes the balance of the oil market. OPEC by the way its not only Arabian (Iran, Nigeria, Angola Venezuela ecc). Still , in proportion, the total world oil reserves are for the 80% in OPEC countries, but reserve and production are not the same: If you have a large quantity of reserves you don't need an immense production because too much oil in the market makes oil price drops, to maintain it at a profitable level, OPEC doesn't produce all the oil it has.

Sixth myth – The producing countries are those who earn most form oil: That's not true, only the 30% of the final cost goes to the producers, the 10% pays transportation and refining (circa, depends on many factors) The final consumer's price is made for the 60% of taxes to the national government.

Oil and Gas: an essential glossary

- **Barrel**: measure of oil quantity since the 19 century when in the US empty whiskey barrel where used in the oil industry.
- **Shock point**: Areas in the world where a large amount of the oil trade passes every day (horn of Africa, the Hormuz entry of the Persian Gulf, the Malacca in the south pacific. Clearly these points are crucial for the entire world energy and they are heavily patrolled. Their actual size are: Suez canal (162 km, 300 mt width), Panama Canal (80 km, 40 mt), Bosphorous (31 km, 550 mt, controlled by Turkey and relations between Turkey and Russia always take this into account), Malacca (800 km, 55 km).
- **Coal**: Before oil was discovered and profitable, the European countries essentially used coal for the industrial revolution, large amount of coal is still used in many countries, especially in China and the United States considering their large amount of coal mines and their impressive needs of energy. In Europe both Poland and the Czech Republic still consume coal, in western Europe pretty much every State shut down their coal mines considering it's high level of pollution.
- **Combustion Engine**: A second revolution for oil industries, because this engine needs oil: the growing private car industry in the world led to an immense use of combustion engine and, by consequence, of oil consumption. Green energy or alternative energy are still not as efficient as combustion engine in term of power production
- **Corporations**: Large amount of single players involved in the oil production and or marketing. (like the anglo-persian oil company now British petroleum
- **Drilling**: A drilling ring is the infrastructure needed to reach the underground oil deposits, this system is still the most used method of extraction
- **Energy mix**. Different energy used to cover the need of power, the combination of different energy sources (Carbon, oil, nuclear, wind, solar etc…) to understand the energy condition in a country we need to know about a country energy mix in the last decades, its present state and history.
- **Field**. Areas where oil or natural gas can be extracted in a country/ocean. This has relatively important political consideration if we consider the Kuwait oil fields, so close to the borders that the near countries have tried to conquer them.
- **LNG-liquified natural gas**. Very volatile and impossible to store it in this state, that's why the oil and gas companies started to liquified this volatile gas to transport it and store it and use it when needed. This liquification process is obviously costly
- **Oil peak**. The exact moment in time when we reach the maximum capacity of oil production in the world. Considering it's not a renewable energy source, in an uncertain future it will diminish and end. There is a strong debate about this oil peak, in the past the peak was believed to be in 1925 but the advance in technology changed the way oil was refined and produced, letting the companies become more efficient in oil exploitation of already discovered oil fields, postponing the so-called oil peak.
- **Permafrost.** The ever-frozen ground in the northern part of the boreal hemisphere, hard frozen even in depth, difficult to drill.
- **Pipeline.** Natural gas (and oil) is typically transported by pipeline for kilometres instead of shipping methods. From a political point of view this clearly becomes important, while ships move from one country to another, pipeline cannot be moved and are expensive, you can't just change the country that's giving you oil or natural gas, you'd have to build a whole new pipeline (Libya has a pipeline to Italy even if it's government collapsed and civil war is a reality, but you can't move the pipeline). The producing country and the receiving one must think twice before deciding to build one.

- **Platform.** One of the most advanced technology to extract oil in the middle of the ocean that postpone the oil peak.
- **Renewables.** Opposed to fossil and not renewable energy sources, this sources are theoretically unlimited and available everywhere in the world (democratic energy) but still quite inefficient.
- **Shortage.** Scarcity of energy, conflicts and poverty.
- **Stocks.** Emergency deposits used to face shortage of energy supply for various reasons, especially international conflicts or disasters (each eu member is obliged to stock oil to cover a national shortage up to 90 day or to aid another eu member in this case)
- **Supplier.** Country able to export oil to other countries (the best option for non-exporting countries is to refer to three or four suppliers to avoid sudden energy supply shortages, this is the current EU energy policy).
- **Tanker.** Widely used in oil trade across the ocean, so large that sometimes can't fit in the Panama or Suez canal.
- **Transit country.** Like Turkey, is a country where oil passes through to join other countries, especially through pipelines.
- **Wells.** While the drilling ring is the machinery, the well is the whole complex used to pump oil.

From Steam to oil: 1850-1950

Coal was clearly fundamental to the industrial revolution, and before that wind and water were the principal mean to produce power before industrialization. The oil "revolution" started in 1861 in Pennsylvania, with the first drilling ring being used to extract underground oil. In fact, oil was already known to humankind: floating oil in meadow were sometimes used, but only in 1861 humankind understood how to extract underground oil reserves. At this moment, in Pennsylvania, a lot of cheap empty barrels of whiskey were available and that's why they were used as a convenient mean to store it. Of course, in this period oil was essentially used for illumination, highly preferred to candles and natural gas (which is potentially explosive and difficult to transport). Oil in the past was used in the medical fields as a drug, because of poor knowledge of oil properties it was considered a sort of natural remedy for diseases. In the XIX century the first refineries, pipelines and train transportation were used in the oil market, not so different from the means we still use today. To understand the location of underground oil fields and its oil quantity the technology advanced in a tremendous rate and today the quantity of oil fields discovered is far larger than ever before. Even the production rates rose dramatically: In 1860 the US produced 450.000 barrel per year, in 1866 3.600.000 barrel per year, showing that oil extraction was remunerative since the beginning (John Rockefeller for example). Europe used to import oil from US, but the discovery of oil fields in modern day Azerbaijan (former Russian Empire) set the beginning of oil extraction in Europe, led by the Nobel brothers in Baku, with a production in 1874 of 500.000 barrel per year and 8.800.000 barrel in 1884. The Nobel brothers built a far-spreading railway network in eastern Russia to transport it, in this period of time, young Lenin and Stalin both worked in Baku's oil fields: this oil extraction fields and it's working class identity allowed those people to become later one the leading core of the Russian evolution, meaning that oil extraction has in fact determined important political events. The young oil industry was then threatened by the invention of electricity by Thomas Edison and Nikola Tesla in the public illumination, severely worrying the oil businessmen in the late XIX century. The solution to this risky predicament came from another American businessman: Henry Ford. Ford invented a vehicle based on combustion engine called "Model T" that became popular in the United States, setting the beginning of private transportation and of important changes in cities landscapes and social life, allowing people to live miles away from their work places and starting the deurbanization phenomenon. The need for oil in Europe and the US brought businessman to look for oil outside of these continents, reaching to the Persian Gulf in modern day Iran (ex Persian kingdom). British businessmen, considering Persia in the Empire's sphere of influence and started to produce oil in this country, not only for the European market but also for the Indian peninsula, the pearl of the Empire. The first turning point in oil exploitation was world war one, were the British empire took

the risk of changing the steam engines of the imperial navy into combustion engine's ships, which were far faster and securer than steam engines, that needed a lot of manpower to manage. Britain was of course a global power and its navy spread in every ocean, that's why the oil fields in Persia were crucial to the empire's Navy: for the first time in history oil became a matter of national security and of military concern. This strategic importance brought the European powers to consider oil reserves crucial for military power and defence, not only for private consumption. So, form world war (and much more after world war II) we need to think about oil from two point of view: private profitable business and national security, and these points of view must always be considered together in order to have a clear understating of oil importance, and those two dimensions can be cooperative or adverse. The inevitable collapse of the Ottoman Empire, the Sykes-Picot agreement and the Versailles conference, led to the formation of French and British area of influence in former Ottoman territory, and especially the British government gained control of the Mesopotamian area, full of oil reserves. At the same time Britain gained a land connection between Persia and the Mediterranean, getting a second strategic route between the Indian ocean and Britain in case of unavailability of the Suez Canal. When Saudi Arabia was created in 1932 was a really poor and undeveloped country, eager to attract foreign investors but not British one, fearing to become another puppet of the British government: that's when the first link between Saudi Arabia and the Us was born, with us investors being invited to Saudi Arabia while the investors were looking for business but the Saudi family made the first move to attract them. That's why for a very long time the Us government kept warm relations with the Saudi family (the family and the State of Saudi Arabia are the same considering the State is propriety of the Saudi family). In 1938 the first oil field was discovered close to the Persian Gulf, in the Saudi city of Dhahran (that later became later the first Us military base in Saudi Arabia). Those oil reserves we really far from Europe and the US and so the US government became more and more conscious of the relevance of oil trade and transport, opening a new chapter of American foreign politics in the Middle east (Eisenhower doctrine). In WWII Germany pushed in the USSR territory not straight to Moscow, but Stalingrad, attempting to destroy the Soviet Union and take control of the oil fields in East Russia. Operation Barbarossa was a definitive defeat for the axis power, creating a dangerous shortage of oil supplies for war operation, severing the Germany war machine. That's why while operation Barbarossa was slowing down, the axis powers tried to seize control of Suez Canal and eventually invade the oil rich Arabian Peninsula, still they lost the battle of El Alamein and the entirety of Northern Africa.

The golden age of oil

Looking at the world energy consumption we can see that coal was by far the most used energy source until the 60', but it's still being used as of today in large quantities. Oil in the '50 started to grow exponentially in the global energy consumption and so in the early fifties we entered a golden age of oil which became more relevant than coal. Together with oil also natural gas is used in energy consumption, not as much as oil and coal, but still relevant especially from the '80. Electricity (nuclear and hydroelectric also became more relevant as time goes by).

In 1924 North America and Europe produced more than south America or the Middle east, so the oil production regions changed radically in time From 1945 to 1973, the consumption of oil in Europe rose of 11-fold and in the US of 3-fold. Of course, the Us were the main consumers in the beginning, but the reconstruction in Europe after wwII meant a need for additional energy in Europe, provided especially form oil (cheaper than coal and flexible in term of final use), Europe so needed oil from other regions not only the US, particularly the Middle-east. The middle-east entered the oil market thanks to the need of oil in Europe in the reconstruction period and especially the beginning of mass consumption of private cars and goods derived form oil, also Japan increased the private car consumption a lot: Europe+Japan cars 1948 53 million, in 1973 250 million. That meant a new situation of vulnerability in Europe, the theoretical possibility of energy shortage due to the absence of enough oil reserves in Europe and needed cheap oil form the Middle east (and as today the EU consumes the majority number of private cars in the world with

260 million). In the middle east the oil production rose form 1.7 million barrels per day, to 20.5 million barrel per day in 1973 and new pipelines were built in '50 and '60 to link the Persian Gulf and the Mediterranean bypassing the Suez canal e shortening the transport of oil (like the trans Arabian pipeline) through a well sensitive and instable region in Palestine and Syria and so Europe became more and more involved in middle eastern policies. A resolution of the national security council of the US number 138, in January 6 1953 suggested the President that middle east and Venezuela were the oil sources that supplied the free world and that these sources are essential to the economic and military efforts of the free world, so nothing can be allowed to interfere with the availability of oil from those sources (in the transition between Truman and Eisenhower administration). One international player fundamental for oil sources are the seven sisters (Esso-Shell-AP-Gulf-Texaco-Chevron-Mobil) and their cooperation was essential for the national government because they pretty much controlled oil production in all the world except the Soviet Union and they were the only players able to expand oil business because of their large quantity of capital and the only players that had the technological knowledge to extract oil (in 1960 the seven sisters controlled 95% of middle eastern oil production and in general of 50% of the entire world).

Oil prices fell down from 2 dollar per barrels in 1950 to 1.20 dollar in the 70 because of the huge rise of oil production from the Middle-east and the USSR (and the USA passed a law to limit oil import to the 19% of national consumption to avoid extreme dependency from other States). In 1951 Mossadeq tried to nationalise the oil production and defend it form the seven sisters, (see TIME magazine) and the Arabian nationalism threatened oil supplies for the free world. Mossadeq was removed from office after a secret operation of the MI6 and CIA. The USSR produced 600.000 barrels per day and in 1973 8.5 million, and a large quantity of these production was exported not only to the soviet bloc but also western Europe. The Italian-national oil company was a public oil company in the western world, unusual considering the seven sisters were private (trying to compete with the seven sisters especially thanks to its president Mattei) and to interact with the seven sisters, the OPEC was formed in 1960, not as an Arab organization, but included also in their founding members, Venezuela and Iran, not to represent the Arab countries as a whole like Egypt and Syria and this was a turning point in the history of Arabian nationalism, with no mention or Arab solidarity. Opec impacted also the Arab world and its dynamics. The dynamic of oil prices shows how oil prices fluctuate not only referring to quantity consumed but also by the relevance of the two oil shocks in the '70. Ussr and Russia are not in the Opec organization for political reasons: in fact, the members were considered to be too close to the western world (many other States like Mexico, Canada or Norway are not in the organization especially because they are unwilling to submit their production to an international organization)

The end of the golden age and the oil crisis in the 1970s

In the mid '70 we can end the golden age of oil, that doesn't mean that we don't need oil anymore, but we are no more in that age where oil was really cheap and there were no shortages. The traditional anti-colonial international policy of the US had to be reshaped because the oil strategic relevance was far too important to be ignored, so they softened their anti-colonial discourse and they applied some policy of the former colonial powers and they had to in order to compete with the USSR in the middle of the cold war: energy was a crucial matter in cold war policies, especially for the crude oil-deprived western world. The birth of decolonisation and the new international climate changed everything, European countries tried to maintain colonial strings as oil sources, and the European powers had to cope with decolonisation revolts in a world where anti-colonialism was spread all over. They adopted different strategies, but the final objective was always the same, not to loose raw materials form these countries. Especially oil, and no to allow the USSR to expand it's influence in those countries. The US had to behave in a doubtful way: had to defend European energy sources (the US was and still is far more secure in term of energy sources than Europe) and yet keeping their traditional of anti-colonialist policies.

The first oil shock is situated when oil prices were very low, because of the limit imposed to import by the us and USSR began exporting causing an over supply of oil (1.20 dollar per barrel). The Opec countries considered this price not satisfactory and the first tensions between opec and seven sisters arose. The seven sisters tried to rise prices reducing production in the middle east but this meant less royalties to the national government of Opec. Some middle eastern government tried to nationalise oil companies like Mosaddeq tried in 1951, though this nationalisation didn't need to cut ties with seven sisters, but they tried to control oil production while maintaining oil relationship with the seven sisters (because the seven sisters and the capital and technology to manage oil business) and the managed to reach many agreements. In 1973 Us spare capacity production runs out, (when a country can increase a level of production, when there are reserves and so you don't have to produce everything you have, this spare production capacity allow to react to any international oil market shortages because in those cases you could react by increasing production) and the law that limited oil import in the US to 19% was abrogated. OPEC countries controlled 55% of the world oil production and so oil price goes up to 2.90 $ per barrel in 1973 and yet this did not reduce oil demand and consumption (also thanks to the increase demand in the US). All this increase was impacted by the Yom Kippur War of 1973 and was the first Israeli-arabian war to see the use of oil supply as a weapon to press the western world, Syria and Egypt tried to seize control of lost territories in 1967, Israeli prime minister asked the US for weapons to resist the attack, Nixon was ready to reply to this need of Israel for additional weapons and sent a relevant amount of lease, at that point the Arab members of Opec entered the conflict not in a military way, but using oil prices, announcing a cut in production of 5% and an additional cut of 5% each month and increasing oil price form 2.90 to 5.10$ per barrel, threatening a future price rise. Lastly the Arab members of OPEC adopted a selective embargo to the USA and the Netherlands (because the Dutch had provided help and support to Israel) . This first oil shock had significative diplomatic consequences: the western European open a new diplomatic office dedicated to Arab policies and relations bypassing US mediation; the first peace treaty between Egypt and Israel thanks to Jimmy Carter mediation worrying a new global oil crises; and lastly a huge transfer of money from the western governments to OPEC countries never experienced before by the international community, and most of this money went back to the western government in form of investments, joint venture and financial bonds, and a relevant financial link between the middle eastern countries and the western world that It's still important as of today. The shock effect on energy market were: the development of new oil fields and technology, in particular of offshore oil fields in difficult environment as the open sea, that became possible because of high oil prices that transformed expensive oil pumping methods profitable (at the end of the '70 oil price per barrel reached 30$); and the development of nuclear and renewable energy to reduce energy dependency from oil exporting countries. Furthermore the western economy entered a period of double digits inflation (the value of money was decreasing year per year) some countries decided to try to resist inflation by a public economic policy of spending cuts, decreasing the public spending, providing less liquidity and a decrease in public services, one more effect was the birth of poor countries debt: because oil prices were so high, third world countries lacking oil reserves had to resort to debt in order to buy oil.

The second oil crisis was due to the Iranian revolution of 1979 and the end of the kingdom of Persia and the birth of the Iran Republic (extremely rich in term of oil fields, and extremely close to the Iraq border and exactly the same is for Iraq) and the rise to power of ayatollah Khomeini and immediately afterwards the beginning of the Iran-Iraq war of 1980. Because of these events, the 8% of oil production disappears originating a new rise of oil prices up to 35% oil per barrel, a tremendous effect on oil prices. Oil prices are influenced by a range of different factors not only war but also workers strikes, fluctuation of the value of us dollars (if the value of Us declines, the oil price rises because the producing countries paid in us dollars looking at the us dollar fall, they rise the price of oil slowing down production in order to compensate the lost in value of us dollars for example in 2005-2008, so oil companies cannot determine oil price immediately). In the '70 oil production was controlled by a large majority by OPEC countries, but as of

today new oil production outside of OPEC countries radically diminished OPEC political and market power. In 1990 Sadam Hussein tried to invade the oil rich Kuwait, impacting not only oil production but also oil trade in the Persian gulf, influencing oil prices.

Key figures on Europe

Eurostat publishes every year a report on energy: form the world energy demand chart we can deduce that the European Union Is currently consuming pretty much the same amount of energy every year since 1990, meaning that the economic crisis resulted in less energy consumption because of less industrial activity but also because of the capability if EU to produce the same consuming less energy, and since 25 years the EU is introducing more and more efficiency to consume less (like isolation, new efficient lamp) and so that's why Eu needs the same amount of energy during time. Also, the other OECD governments consume the same amount of energy in time, but other countries such as China are expanding their industrial production and demand more and more energy. Considering the European Union, it's energy consumption is covered by 55% circa by energy imports (calculated in Million tons of oil equivalent used to compare the different amount of energy coming from different energy sources: ex 1 million tons of oil is equivalent to N amount of natural gas) of course these means the EU is dependent in term of energy needs and vulnerable that's why it's trying to be more efficient. If we analyse in depth the energy import, oil is by far the most needed energy source from import because of the lack of oil production in the European Union. In addition, every different country member of European Union has its own import dependency very different form each other, because every State has a different domestic production of energy that reduce their import needs and this makes it very difficult to have a common energy policy; especially in oil import the majority of Eu members are dependent by the 80%. In term of Gas Is pretty much the same. The Eu energy mix from 1990 and 2009 changed especially in the coal share which reduced and the rise of oil and gas share (every member state has different energy mix, with countries with high amount of nuclear energy and renewable, while others rely on oil and natural gas). Most of the energy consumption is needed for industrial, transport activities and households (the highest share goes to transport) and only a small fraction for services or agriculture. The Eu domestic production change from 1990 to 2009, implying a rise in nuclear and renewable energy and a decreasing production in coal energy. In terms of electricity generation, in 2009 the energy source used for electricity is based on natural gas and renewable energy. In terms of renewable energy in electricity generations the eu members behave differently with few of them producing a lot of energy and others that are not using it (like Poland Czech republic that still use coal), nuclear energy that Is used only in electricity generation and France from example produces 76% percent of electricity through nuclear and Italy stopped it's nuclear production in the late 80', and that's why Italy produces half of it's share through natural gas.

Energy security in Europe, what does it mean?

Energy security: the *availability of sufficient supply* of energy at an *affordable price*. And European energy security could be jeopardized by many factors: **technical factors** like accident, calamity or blackouts, **political reasons** such as a interruption of supply caused by international conflicts or tensions especially when relying on external suppliers, **economic factors** like a rise in oil prices or the environmental taxes or transport prices.

To avoid technical problems Europe can take preventive actions such as a day by day activity of maintenance of pipelines and electric grid, the improvement in the integration of our energy network to create alternatives route of energy supplying and the so called two-side flux in an integrated network. To recover from them Europe can act with technical collaborations among European countries, or to monitor consumption and emergency stocks.

To avoid the political problems Europe can, as preventive actions, increase the number of energy suppliers not to rely on the same supplier, increase the cooperation and diplomatic relationship with producing countries in the first phase of energy production called “up-streams” (transport, oil search and extraction) by creating joint-ventures between European and foreign oil company, and by sharing technology and knowledge in the up-stream half of oil market with producing countries. To react to political problems, Europe can take emergency actions such as looking for other suppliers and rely on emergency stocks or rely on diplomatic (or military) actions.

Economic factors: to avoid problems in this field Europe can become efficient and save energy (and is already doing so) or change the energy mix in order to have may different sources of energy and not only one, and by developing on new renewable energy, available from domestic energy. For emergency action Europe could act using fiscal tools to save energy, through austerity and diplomacy.

The European union can act together with the European national government, or/and with oil companies, and in the end especially in emergency with the final consumers. At the European level, these countermeasures are partially set and codified since the ’70, like the mandatory stocks of oil for 90 days for every European member. Still even if Europe is trying to be efficient, we are losing domestic energy production and that means an increase of energy dependency and so for the moment and at least in the medium-term, Europe is and will be vulnerable in terms of energy. That’s why Europe imports oil form many different oil suppliers like Russia, Norway, Nigeria, Saudi Arabia, Iraq etc… and Nigeria is more important in term of oil supply then Saudi Arabia. Natural gas, that is less flexible in term of transport a usually need a pipeline, Europe imports mainly from Russia and Norway and countries closest to Europe because of a technical limit in the pipeline network and so we cannot diversify natural gas as much as oil.

High oil prices are not always a negative factor: of course, that means from a consumer perspective that oil will be costlier, but very low prices could lead to a neglect on energy savings and investments on renewable or alternative sources.

The current situation in terms of energy security in Europe can be threatened also by too long pipelines like the Siberian one or form old-age refineries that are not efficient and expensive. Liquified natural gas can be stocked, and is more flexible than natural gas per se, although Europe doesn’t have gas stocks like the oil ones, and this is a predicament because relevant natural gas stocks could be used in case of shortages, but right now is difficult to create facility to stock LNG because of environmental problems and fear of national communities and LNG is more expensive than oil of course.

In 1993 in Moscow Gazprom was founded and became the most relevant company in natural gas business, in all the different steps (search, extraction, production, transport and final market) both a up-stream and down-stream company. The Russian government owns half of the property of Gazprom and controls 17 % of global reserves of natural gas and provides about 27 % of European gas. Gazprom also owns banks, newspaper and football teams (Medvedev current prime minister of Russia was the chairman of Gazprom board) and of course they depend form the European need of gas, they need to sell it and so creates a interdependence.

Eni and Gazprom: the Italian oil company created a joint-venture with Gazprom 10 years ago to connect southern Russia to Balkans and Italy but in 2015 after the annex of Crimea by Russia and the sanctions form Europe, Russia abandoned the project. Italy has different sources of suppliers.

The Eu policy as a response to energy security threats

The apparent need for a common energy policy, this could allow the European Union to have stronger stand with exporting countries, and it’s considered crucial in continental and external energy policies. Still, the European members should have to agree on a transfer of power to the European commission from

matter of State's competence. The point is that, as usual, the national governments are not willing to lose their exclusive hold of energy policies because of the national security relevance that these policies have. Although the European commission is trying to transfer those powers, from the late '70 up to now the transfer of power in energy field is insufficient and far form complete. The European commission is working since the '60 in energy policies although these attempts came to nothing. Only the oil shocks and the birth of the single market in '80, energy policies became a matter of discussion between the European commission and national government. Even if the single market is not referred to energy market, it's natural to think to the energy market as a possible single market. By the mid '80 the commission was able to succeed in establishing its competence in information gatherings (could at last know in depth every state's energy policy) target settings (and this meant that was possible to discuss with the national government to propose common Targets) and to enable activities, and yet the bulk of power in energy policies was still in the hand of the member states. In the late '80 the policy agenda began to change, because of shifts in energy markets, especially of oil prices (very low because of oil supply) and the national government believed that energy issues were not threatening national security, allowing the European commission to gain a more important role in energy policies, approving more efficient rules in energy consumption and energy savings. The European commission could refer to precedents in competitive arrangements and share of technology, introduced for other industrial activities and applied to the energy market in the European market, because of the sliding and silent expansion of the commission's powers. The benefits of an improvement of a single energy markets range from a reduction in private and industries costs, from an increase in European producers' competitiveness in the world market, to an increase in supply security by improving the rationalization and integration in energy supplies. Since 1988, the commission has liberalized procurement practices to increase energy domestic production, liberalized a part of the electricity and gas market reducing barriers to the market (as a policy of dismantlement of public monopoly in the neoliberal views) and by liberalizing the offshore exploration trying to balance this with environmental concerns.

The European Union opened several diplomatic offices to address agreement with the gulf cooperation council in 1989 (Kuwait, Emirats, Saudi, Oman Qatar ecc) in order to create a regular dialogue every six moths with those countries, or the Tacis program in1991 after the collapse of USSR, intended to provide technical assistance and knowledge sharing's in energy fields to the new confederation of independent countries, in this tacis program, a sub project in 1993 Tracea (transport corridor Europe Caucasus Asia) to develop economic relations and trade transport in many fields and of course also in energy (like railways, highways and pipelines) and the sub program INOGATE (interstate oil and gas transport to Europe) focused on oil and gas trade to promote regional integration of pipelines systems of former USSR that still pass in Russian territory and not straight to Europe, and acting as a catalyst to attract new private investors an the political will to create alternative route to Europe. In INOGATE, the European Union is member of this program, not the single member states (and neither Russia of course). The energy Charter treaty in 1994 has 52 members who share the aims of promoting security, integrating the energy sectors of former Soviet Union into the European network and to strengthen their rule of law on energy issues, to reduce risks in foreign investments, by knowing exactly how energy market is regulated in certain countries, reducing uncertainty. The Barcelona process (euro-Mediterranean partnership in 1995 comprehends a wide political economic and social relations between Eu member States and partners of southern Mediterranean (now substituted with European neighbour foreign policies), the Eu-Russia energy dialogue established in Paris in October 2000 considering Russia a relevant partner of the European Union in energy matters to provide reliability security and predictability of energy relation in the long term, facilitating cooperation and negotiations and the Baku initiative in November 2004 in Azerbaijan , a country with good oil and natural gas reserves, and the European Union is willing to finance and support the Caspian countries in oil exploitation, transit, environmental rules and market.