

**TITLE:** The impact of Shale, fundamentals and geopolitics on the crude oil imports mix: Analysis of three key countries.

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## **ABSTRACT**

Traditionally, the oil sector has kept a narrow relationship with oil fundamentals and geopolitical events due to its strategic relevance to the countries. Geopolitical conflicts, wars and technological developments have forced countries to change their oil suppliers, provoking a shift in the crude oil worldwide flows.

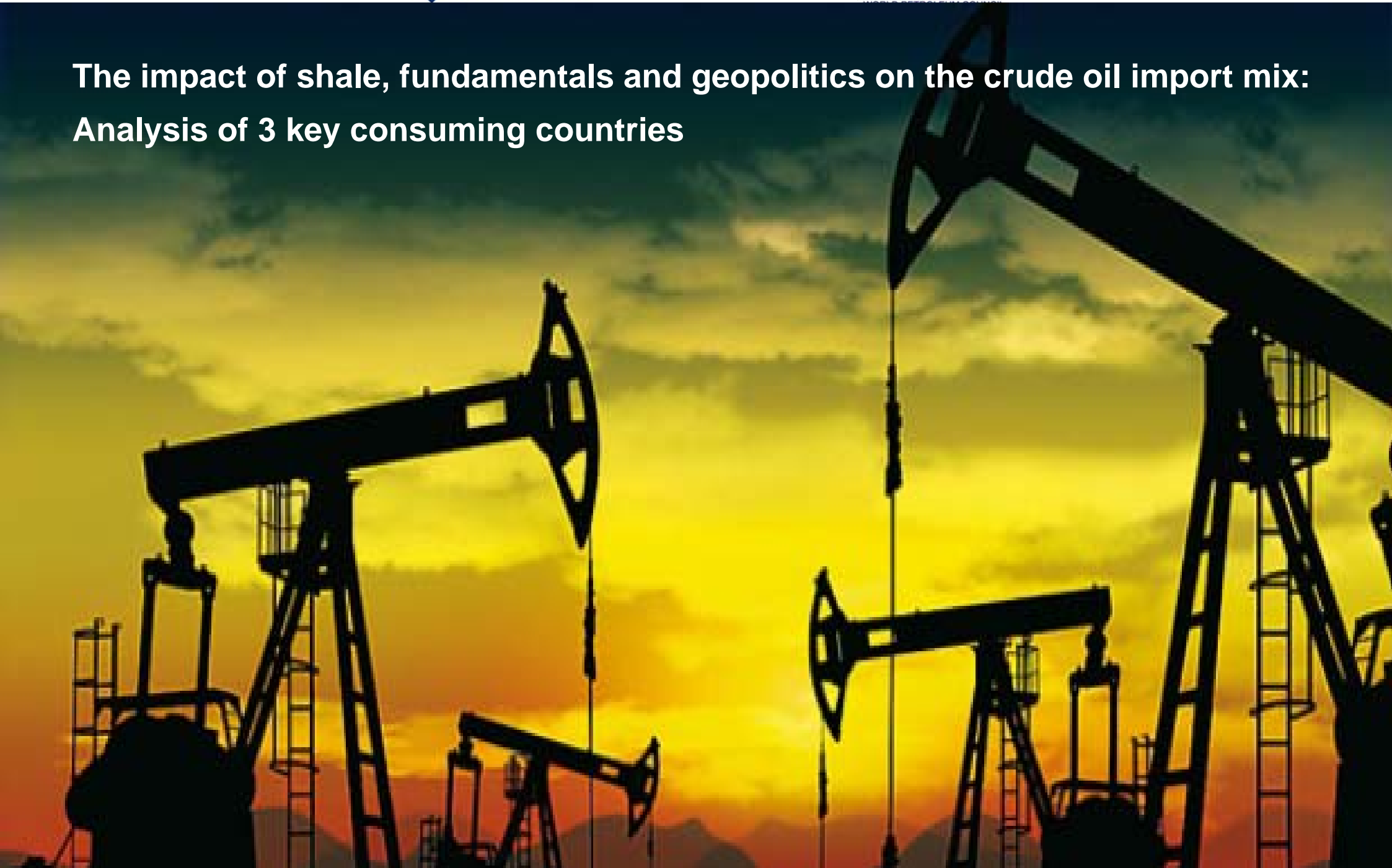
The objective of this paper is to analyze, under a new approach, the evolution of the oil imports mix of 3, strategically selected, key consuming countries (United States, Spain and India) in the period between 2005 and 2015; based on both the geopolitical events and market fundamentals, including increases and decreases in the refinery capacity and consumption, and the new role of United States as an oil shale producer.

The methodology selected to achieve the objective consists of developing a deep individual analysis of each country and supporting our ideas with graphs in order to visually help the understanding of the paper. We will be able to observe the importance that the different oil producing countries and geographical areas have over the 3 selected countries during this period in order to have a better knowledge of the distribution of the imports mix and the relationships between them.

Furthermore, besides doing an individual analysis, we will also analyze it from a global perspective, including a comparison between the different import dynamics and identifying common points and differences.

The analysis concludes with the identification of the drivers which impacted in the import dynamics, such as Iran and the end of the oil exports ban, among others. The analysis concludes with the identification of the drivers which impacted in the importation dynamics, such as Iran and the end of the oil exports ban, among others.

# The impact of shale, fundamentals and geopolitics on the crude oil import mix: Analysis of 3 key consuming countries



# Introduction

Traditionally, the **oil sector has kept a narrow relationship with oil fundamentals and geopolitical events** due to its strategic relevance to the countries. Diplomatic conflicts, wars and technological developments have forced countries to change their oil suppliers, making a shift in the crude oil worldwide flow.

**The objective of this paper is precisely, to analyze under a new approach the evolution of the oil imports mix of 3 key consuming countries, strategically selected, in the period between 2005 and 2014;** attending to both the geopolitical events and market fundamentals, including increases and decreases in the refinery capacity and consumption, and the appearance of United States with its new position as an oil shale producer.

The methodology selected to achieve the objective consists of developing a deep analysis of each country, individually, supporting our ideas with graphs in order to visually help the understanding of the paper. We will be able to observe the importance that the different oil producing countries and geographical areas have over our selected countries during this period for a better knowledge of the distribution of the imports mix and the dependent relationship between them.

Each of these three countries is strategically selected for different reasons:

**United States** has been chosen for several aspects. Firstly, we want to observe the worldwide influence produced by the emergence of the shale revolution which nucleus is situated in U.S., the top crude oil consuming country, allowing this country to make a structural change trying to reach a greater energetic independence. As a consequence, the world oil trade flows will shift, mainly due to the decrease in African crude imports. At the same time we will also focus our attention in the relevance of the Dollar as the principal currency of the oil world market and its relationship with

geopolitical events. Finally, it will be interesting to conclude with the lifting of the U.S. Crude oil export ban.

The most interesting reasons for the second country, **Spain**, are its absolute crude oil external dependence and the increasing imports from African countries due to the flow transfer of crude oil African exports from U.S. to European countries since the start of the Arab Spring and the shale revolution. The increasing imports occur at the same time as Spain expands its refining capacity and growing complexity of the refining system.

The third country strategically chosen is **India**, an emergent country with increasing consumption in the past years, called to play a fundamental role. Therefore it is interesting to analyze, from this perspective the changes in the imports mix. The majority of its imports come from Middle East; we will make emphasis in the evolution of Iran's crude oil exports to India taking into account the international sanctions imposed to the Persian country owing to its nuclear program, which is starting to come to an end, and the introduction of Venezuela as a main supplier.

Furthermore, besides doing an individual analysis, in this paper we will also analyze from a global perspective, including a comparison between the different importation dynamics, identifying common points and differences.

The analysis concludes with the identification of the drivers which impacted in the importation dynamics, such as Iran and the end of the oil exports ban, among others.

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# U.S. Shale revolution impacts dramatically the world oil trade flows

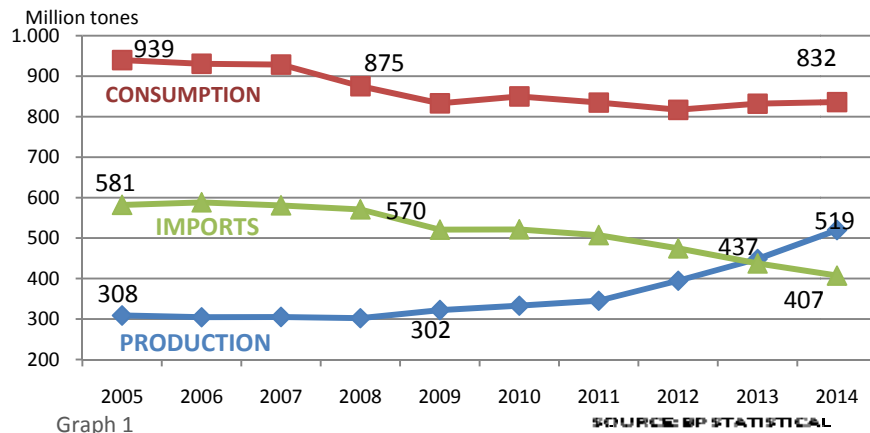
## ***U.S. Crude imports decrease in response to the national oil production take off***

United States is the number one consumer country of crude oil in the world, even though its production has increased over the last 10 years. In many aspects there have been significant improvements and the country is well placed to continue to deliver a reliable, affordable and environmentally sustainable energy system.

What brings our attention to this graph is consumption in slight decrease – due to the economic crisis –, an increase in the national production and an imports decline in the last 10 years.

Over this period, the total consumption has been reduced. Likewise, the total importation of crude oil has been decreasing considerably.

## **Consumption, imports, production and refining capacity in U.S. 2005-2015**



However, this import reduction was caused by a complete different reason. The high prices of oil during the six previous years encouraged investigations on new energetic sources to cope with the high consumption levels. In the case of the United States, its most advanced measure has been the non-conventional crude oil extraction, a process commonly known as Shale Revolution.

This new source consists of a type of crude oil which is found in a condition that does not allow the fluid movement either because it is stuck in low-permeability rocks or because its high viscosity makes it complex to refine.

It requires the implement of special technology for its extraction, sometimes owing to the own properties of hydrocarbon and others to the characteristics of the rock that contains it.

This interesting non-conventional source has taken relevance because of its foundation hydrocarbon fields that were thought to be depleted and estimated to be founded in high quantity.

The development of this technique has increased the U.S. crude oil production. Their crude oil imports have been exceeded and there is a possible open doorto a new U.S. exportation era, especially after the suppression of the ban in oil exports in December, 2015. The only thing that they need to be cautious about is the low prices that crude oil is experimenting worldwide.

# U.S. Shale revolution impacts dramatically the world oil trade flows

***From 2010 onwards there have been structural changes in the U.S. oil imports mix with the growing importance of America, while Africa practically disappears.***

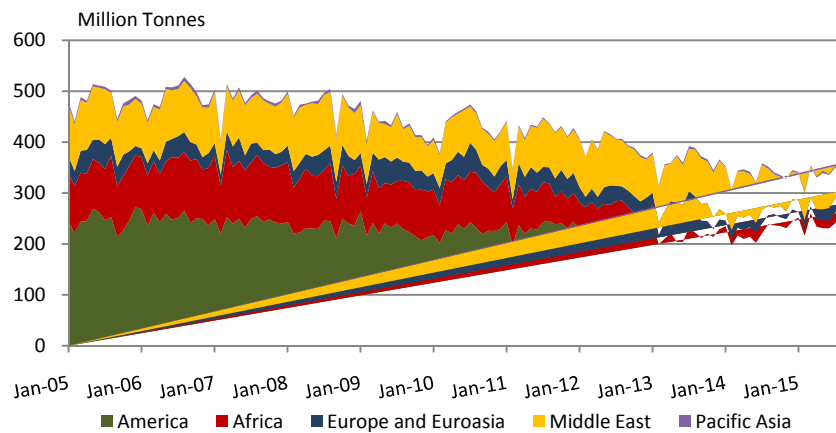
We can examine how the crude oil imports have stayed constant between 2005 and 2008, importing around 580 million tonnes. From then on crude oil imports decreased.

In the third graph it is interesting to pay attention to how the imports that came from northern Africa have reduced to minimum. There has been a notorious decrease in the demand of African crude oil, getting from representing 21% of United States imports in 2005 to only a 5% in 2014. This situation contrasts with the situation of America who has had 15%

increase in its relative weight in the oil imports in 9 years, from 51% in 2005 to 66% in 2015. Canada neighboring country with the U.S. and an oil exporter country itself is the main player in this relevant change. With the North American Free Trade Agreement (NAFTA) in 1992, United States and Canada established, along with other measures, free crude oil trade between them. Mexico did not join to this initiative, but is nowadays approaching the US for a similar agreement. Nevertheless, the key partner of the “land of opportunities” is still its northern neighbor.

Finally, it is necessary to pay attention to the oil imports from Europe and Eurasia. They have been halved throughout this decade, motivated by a reduction in the almost 50% of the oil imports coming from Russia, country who had a representative part in the crude oil coming from Europe and Eurasia.

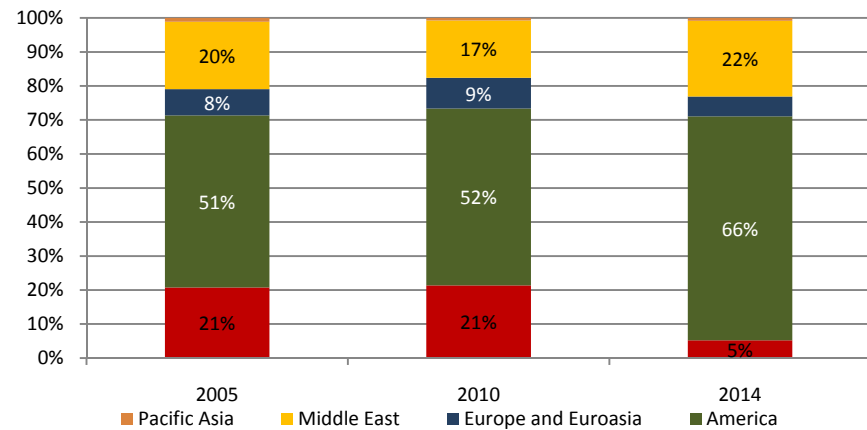
**U.S. Crude Oil Imports Mix by Areas from 2005-2014, in months**



Graph 2

SOURCE: International Energy Agency (EIA)

**U.S. imports mix in 2005, 2010 and 2014, in percentage of total**



Graph 3

SOURCE: International Energy Agency

# U.S. Shale revolution...

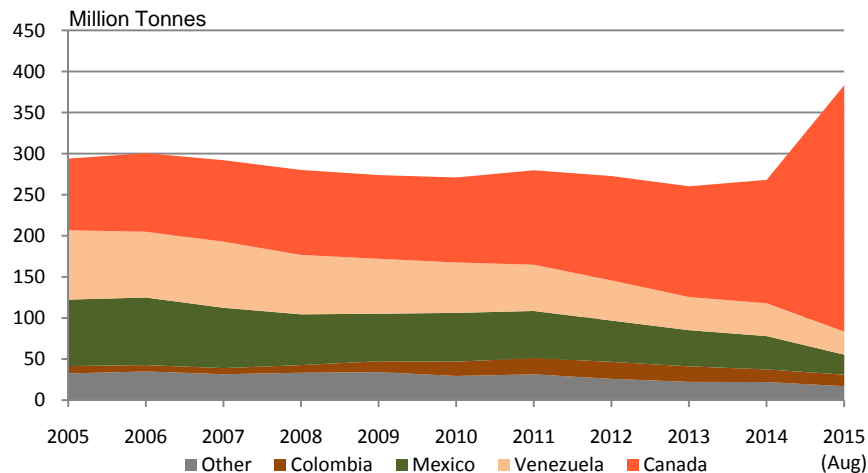
## **Canada settles its first position in 2015, accounting for 80% of total crude oil imports from America**

In the followed graph we can observe how the crude oil imports from this area have stayed constant during the analyzed period, with Canada as the main supplier, followed by Mexico and Venezuela. Nevertheless, the most interesting information we can obtain from this graph is the exponential growth of the named main supplier in 2015, which doubled its exports to the U.S. in only 8 months.

This behavior is probably related to a possible geopolitical strategy of de United States to reduce its energetic exposition to other countries outside America.

Canada already covered a huge amount of the U.S. imports in 2005, with 80.4 million tonnes a year. Later in 2015 (Jan-Aug) the figure got to around

### **U.S. Imports Oil Mix from America between 2005-2015**



Graph 4

SOURCE: International Energy Agency

300million tons a day, a 30% of the total. The 70% left is distributed more or less between 50 other countries, highlighting Mexico (24.25 million tons), Venezuela (28.05 Mt), Colombia (14.15 Mt) and Saudi Arabia (34.60 Mt). This data allows us to appreciate the clear importance of the American continent in the U.S. oil import mix.

The communication network between United States and Canada has taken a greater dimension. Together with the pipeline, the railway has become a relevant crude oil way of transport between these two countries, giving life to an otherwise abandoned infrastructure. In addition, Canada along with United States started an oleoduct project, known as Keystone XL, which would have had transported around 830 KBbl/d. However, in November 2015, U.S. president Barak Obama paralyzed this project due to the environmental concerns that some groups had with it.

Per contra, we must emphasize the constant quantity exported from Saudi Arabia during the 10 years taken into account for this study- Due to the kind of contract that Saudi Arabia (Saudi Aramco) signs. In fact, this country has been the main Middle Eastern oil exporter to the United States. In 2015 they cover almost the totality of the U.S. imports coming from the Middle East. It is important to mention that this stability in the oil supply from Saudi Arabia could be lowered by the opening of diplomatic relationship between the United States and Iran together with the possibility of the US becoming an oil exporter and therefore reducing its own crude oil imports.

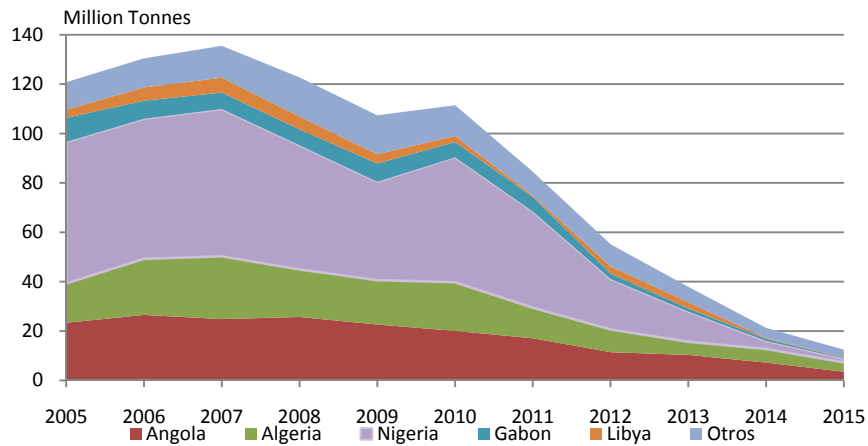
# U.S. Shale revolution...

## ***African oil disappearing and flowing to other geographical areas***

Some geopolitical incidents could have affected the drop of African exports to the United States, which were reduced significantly starting in 2011. This was strongly influenced by the civil conflicts that took place during the Arab Spring, when the oil wells became one of the main struggles between regime and opposition forces. Notwithstanding, the main reason was the development of the Shale Revolution. Thus, in only just four years, the countries of this continent turned from exporting 121 million tons a year to United States to only 12.5 million tons a year, which is reflected in their new oil imports mix, as we can see in graph 5. These crude oil exports have been forced to find new markets in other geographical areas, like France or the United Kingdom, creating new flows for this raw material.

Moreover, in 2015, with the start of the negotiations to put an end to the Iranian sanctions and the decision taken by Saudi Arabia, as OPEC leader, to stop being the ones adjusting the oil market the fall in the crude oil prices has boosted the United States oil imports. In this scenario, the United States could play a crucial role depending on its decision. It can either recover the upward track of the imports, or on the contrary, start as a new oil exporter- after the suppression of the ban in oil exports which started in 1975 after an energetic downturn-.

## **U.S. Imports Oil Mix from Africa between 2005-2015**



SOURCE: International Energy Agency



# U.S. Shale revolution...

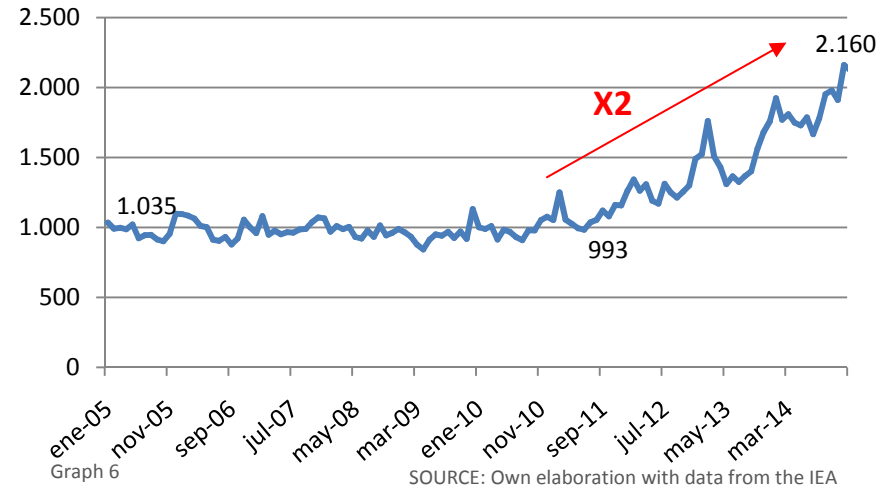
## ***New strategy in the mix, evolving to an American imports concentration***

The graph 6 represents the Herfindahl Index –also known as Herfindahl-Hirschman Index, or HHI. This index measures how diversified is the imports mix of United States in relation to the number of countries from which U.S. imports crude oil and to the quantity bought to each of those countries, through the sum of the square percentage of imports that come from each of the countries. The closer the index is to 0, the more diversified imports mix U.S. is going to have. On the other hand, the closer the index is to 10000 the less diversified the imports mix is going to be. (i.e. if one country imports the 100% from another country, the index will reflect a 10000 therefore no diversification).

The evolution of HHI in United States helps us to support the arguments used up to now. It reflects two different stages. From 2005 to 2009, this index has been practically constant and around a thousand points, but, since 2010 along with the Shale Revolution it has more than doubled its index value.

The results obtained with this index show the consequences of Canada's new position in crude oil imports mix which has reduced the diversification. 80% of total imports come from America in the first 8 months of 2015, and 63% exclusively from Canada. Nonetheless, it is important to keep in mind that if Canada had not been taken into account in the index, the diversification would have increased. This is because the number of countries from where U.S. imports crude oil has expanded.

**The Herfindahl Index (HHI) of U.S. from 2005 to 2014**



To briefly summarize, the Shale Revolution drives to a greater independence of U.S. in the energy sector, increasing the production which substitutes the crude oil imports. This fundamental change is complementary with a greater concentration in the crude oil imports from the rest of America, highlighting Canada, its main ally in the sector. The most affected area is Africa that practically disappears from the U.S. mix and flows to new areas such as U.K. or France.

Now we will turn the analysis to Spain.

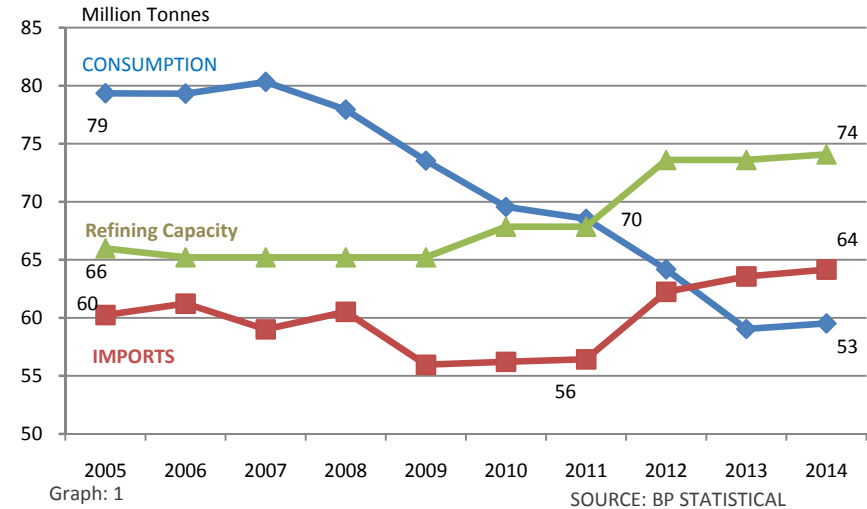
# Geopolitics and structural changes turn on a new crude oil imports mix in Spain

***In an environment of dropping consumption, imports increase boosted by a grow in the refining capacity***

Being Spain a developed country and not having crude oil resources, it is forced to seek abroad for this fundamental raw material in a diversified oil import mix trying to ensure his energetic supply needs. Spain’s crude oil imports mix is really diversified. Nowadays its imports come from over thirty countries around the globe.

In the analyzed period, consumption in Spain has considerably decreased, since the peak in 2007 (80 Million tonnes), due to the economic recession suffered. In contrast, imports increase owing to the improvements in the refining capacity.

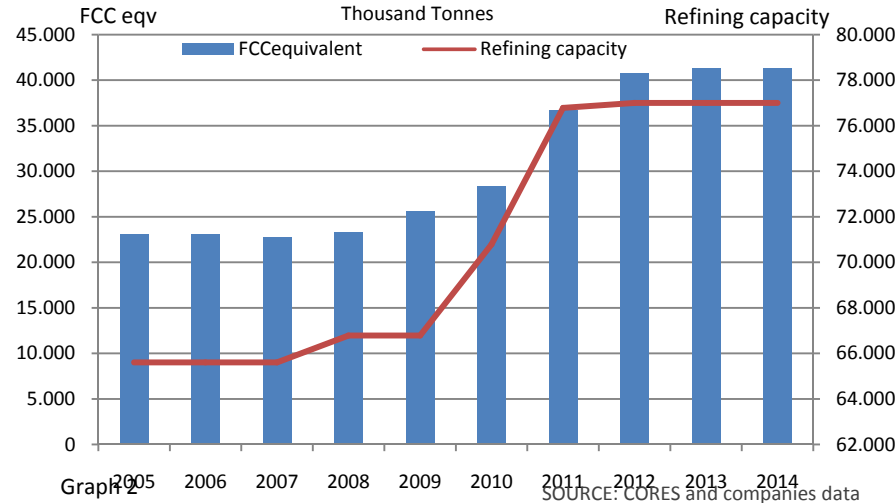
**Imports, consumption and refining capacity of Spain in 2005-2014**



Spain has a benchmark refining industry, with relevant investments in the last years in improving their refineries. This entire progress let Spain refine heavier crude oil, and to have more refining capacity and complexity (measured with the FCC equivalent).

The graph below shows the evolution of the different improvements in Spanish refineries having increased its refining capacity and the FCC eqv. The FCC eqv. is a complexity ratio of Conversion Capacity over Primary Capacity. The higher the complexity index is, the higher the capability of a refinery to produce high equivalent quality and value products.

**Refining capacity and FCC eqv. of Spain in 2005-2014**



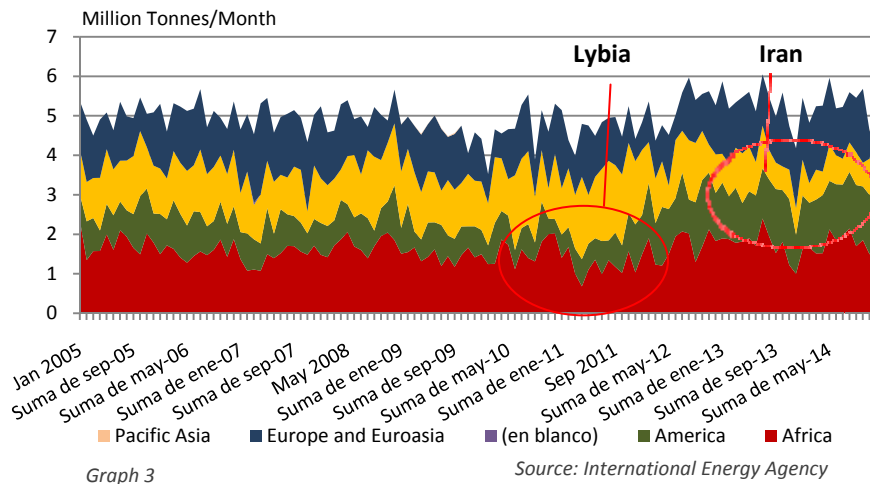
# Geopolitics and structural changes...

## Imports from Middle East get reduced, while imports from America and Africa increase

As we mentioned at the beginning, Spain does not possess its own national production. Therefore, it is obliged to stock up with external crude, and the stockholding security requires maintaining a highly diversified mix just in geographical areas as well as in countries.

In such way that is how it is displayed in graph 3, with constant changes, not only in the first quarter of 2011 when Africa experienced a dramatic fall in the exports- mainly because of the war in Libya- which will recover not so after with higher imports from Nigeria and Angola. Also, in 2012 we can see how the Middle East lost importance in the mix due to Iranian's embargo, which is compensated with a bigger quantity of the imports coming from America.

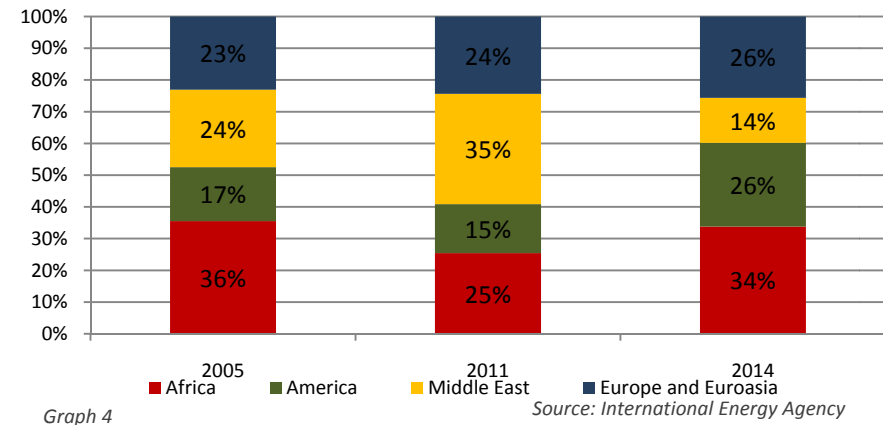
**Spanish Crude Oil Imports Mix by Areas from 2005-2014, in months**



## Structural change in the mix resulting from both, geopolitical events and changes in the refining structure

In graph 4 we can observe a highly balanced distribution between the 4 main areas; Africa, America, Middle East and Europe and Eurasia. Africa holds the highest relative weight, around 35% at the beginning and the end of the analyzed period. There is a reduction in 2011 explained by the slowly disappearance of Libya as a supplier as a consequence of the Arab Spring. America increases 9 percentage points since 2012, because Iran was the main supplier of Spain from the Middle Eastern area, as it was explained before. Mexico – main American supplier for Spain – has covered Spanish crude oil imports, altogether with an increasing participation of Colombia in the Spanish mix. This participation started increased in importance since 2011 and has turned Colombia into the second biggest American exporter in the mix of Spain, ahead of Venezuela. As a counterpart, the Middle East has reduced its relative weight in 21% in the past 3 years. Finally, Europe and Eurasia maintain a practically constant level throughout the period, of around 25%.

**Spanish imports mix in 2005, 2010 and 2014, in percentage of total**



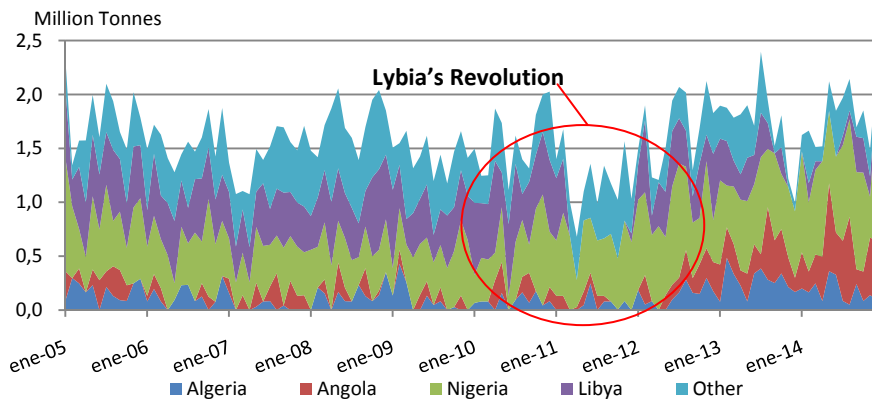
# Geopolitics and structural changes...

## **Africa stays as main supplying area even though internal mix changes**

In 2011 Libya suffered a civil war, after which it turned into a *failed State*, in a worldwide known process: the Arab Spring. This set of revolutions that started in December 2010 with riots in Tunisia, was also followed by other African countries like Egypt or Algeria, causing a huge instability in many northern African countries. There were huge confrontations between government interests and the demand for democracy from the citizens. Despite the problems to come to an agreement in some cases or forming new democratic governments in others, practically all these countries were able to continue with their crude oil exportations. However, this was not the case for Libya, which could not recover the stability and finished with its crude oil exportations, as we can see in the graph 5.

Here takes place one of the most interesting events up to this moment. The Shale revolution stopped African crude oil imports to U.S., and this crude oil flowed to new countries, like Spain, that was one of the countries attracted by this situation- especially with Nigeria, that won weight in the Spanish imports mix-

### **Spain imports oil mix from Africa between 2005-2015**



Graph 5

Source: International Energy Agency

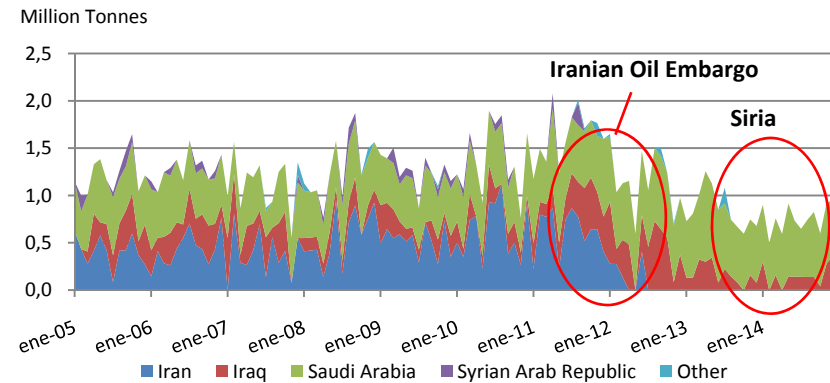
Spain

## **Imports from Middle East fall caused by Iranian's embargo and the internationalization of Syria's conflict**

Another relevant event that drives the new Spain imports mix took place in 2012 with the Iranians when Europe and the United States decided to impose international sanctions and to stop the oil imports from this country –which is the third world oil exporting country– as a consequence of the nuclear program they were developing. This event, not only left Iran in a complex situation, but also pressed the occidental countries to search for alternative crude oil exporters in order to obtain this essential raw material.

Spain actually suffered the effects directly, as we can see in the graph 4. In less than one year, Iran lost his important position in the crude oil import mix of Spain. To overcome this setback, the European country increased its imports chiefly from the African countries; Nigeria, Angola and Algeria. Saudi Arabia did not really suffer changes in its export volume, because it traditionally establishes fixed contracts of export capacity with import countries. Whereas the United States did not experiment the effects directly- as it was not an Iranian oil importer- it actually did suffer from the reduction of the world supply which, with the Saudi Arabia oil supply adjustments, favored the increase in the crude oil prices.

### **Spain imports oil mix from Middle East between 2005-2015**



Graph 6

Source: International Energy Agency

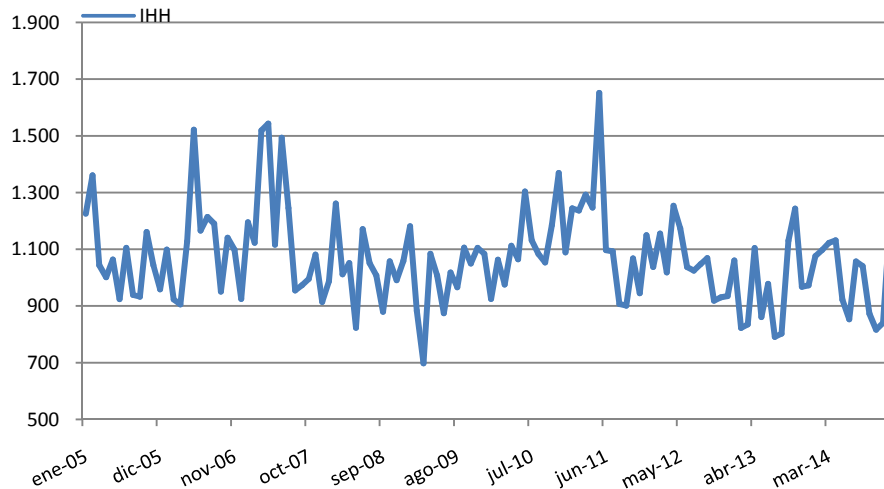
# Geopolitics and structural changes...

## ***Despite the structural change in the imports mix, the diversification degree remains in a really high level***

The Herfindahl Index (HHI) of Spain is really low, due its proximity to 1000 in all the considered period, which means that it has really diversified imports. The index for Spain directly reflects the two key energy aspects that Spain has. First, its geographic location: Spain has a peninsula that has access to the Atlantic Ocean, Mediterranean Sea and Cantabrian Sea, a position that facilitates the diversification a lot. Second, its energetic dependence: this forces Spain to diversify its supply in order to be secured in terms of energy.

Spain's crude oil imports mix is really diversified, nowadays its imports come from over thirty countries around the globe.

### **The Herfindahl Index (HHI) of Spain from 2005 to 2014**



SOURCE: Own elaboration with data from the IEA

In geographic terms, Spain has some advantages thanks to its strategic geographic position. Firstly, it has a good connection network. From the north, Spain can be supplied with oil resources from the North Sea. From the East it can take Russian and Middle East crude oil. In a southern route, Spain has easy access to African oil resources and finally, from the west side, Spain can be provided by the American supply.

To briefly summarize, the strong energetic dependence forces Spain to have imports mix really diversified, by both, by geographical areas and by countries. Despite of the low consumption – due to economic recession which started in 2007 – the European country has increased its imports boosted by the refining industry that increases in capacity and complexity. These changes have allowed Spain to process heavier crude, which facilitates the diversification. The geopolitics events that affected this country, despite of not being involved in any, are the Arab Spring, where Libya stopped exporting to Spain, and Iranian's embargo, main supplier of Middle East. The crude oil that came from Iran will be substitute with crude oil from Algeria and Nigeria.

After analyzing Spain is time to turn to the Republic of India.

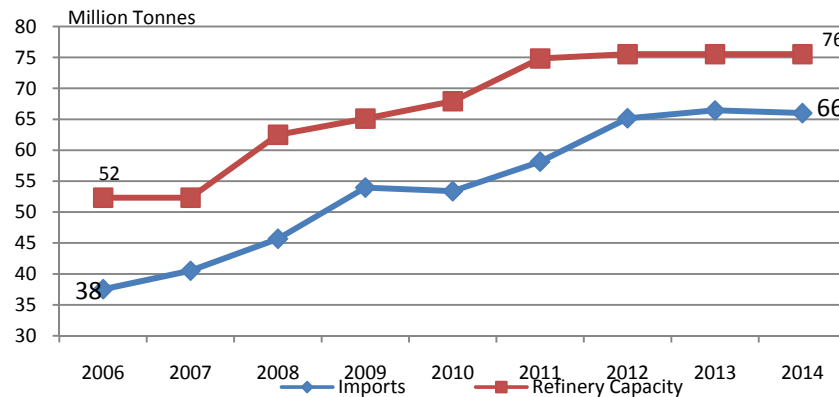
# India's geography and bilateral treaties help to diversify the increasing imports

## ***Growth of the crude oil imports to supply an increasing refinery capacity destined to national market and exportation***

After the analysis of the United States and Spain an analysis on India as our selected emerging country is on place. India is the fourth largest crude oil consumer in the world, only after two of the most developed countries, - United States and Japan- and China, a neighboring country and one of the main developing countries in the world.

Since 2000, India's economy has grown at 7% annual rate, an enormous growth that has taken India to increase its energetic demand. The traditional energy resource of India is coal, available in large amounts, mainly in the eastern half of the country. However, it is not enough to satisfy the population energetic needs, at a quicker expansion speed than the coal industry. This fact altogether with the need to create industrial products, led India to seek for a complementary energy resource, and it could not be other than petroleum.

### **Crude oil imports and refinery capacity of India 2006-2015**



Graph 1  
Close date in april

SOURCE: Ministry of commerce and industry of India

Due to the shortage of crude oil production in comparison to its populated territory, India has seen itself forced to become a net importer of crude oil. By the time India increased its crude oil imports it began developing the second biggest refinery industry in Asia. In graph 1, we can observe how the imports and the refinery capacity evolve along the whole analyzed period, from 38 and 52 Million tons in 2006 to 66 and 76 million tons, in 2014.

The refinery industry is increasing in importance India, to a great extend thanks to the government support, which manages a 62% of this industry and gives facilities for development it in the private sector.

Geographically, India's refineries are mainly located in the western half and in less quantity in the south of the country. These two areas are strategically selected for two considerable reasons. First, because the leading transportation method of crude oil is the maritime route and these extensive coasts facilitate the commerce with the entire world; and second, for it is proximity to the Middle East connected through the Arabian Sea.

India's most remarkable region in the refining industry is Jamnagar, the closest coastal region to the Persian Gulf. This region accounts for 29% of India's total refining capacity, due to its good geographical conditions that lower transportation cost.

The great evolution of this industry in this country has generated incentives to keep on developing and growing the structure and capacity of refining industry and has taken a key role in the petroleum total process.

As a result, India has become both: a crude oil net importer and a petroleum product net exporter.

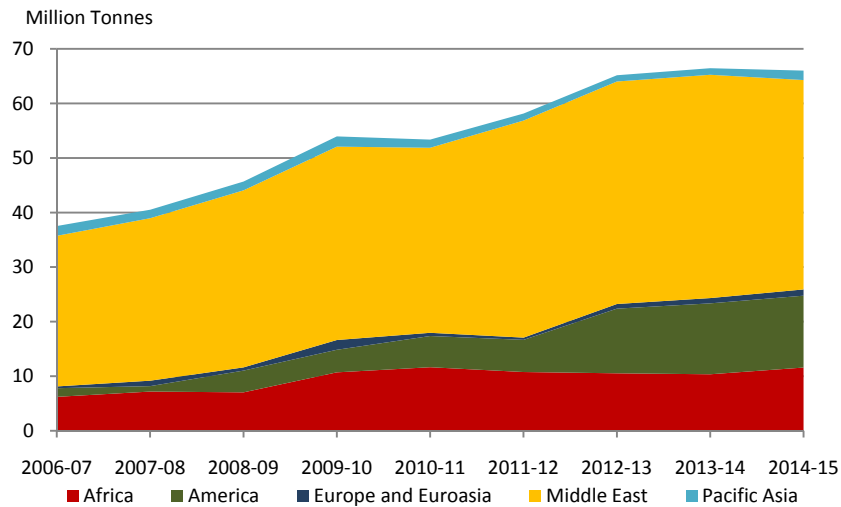
# India's geography and bilateral treaties...

## **Middle East, still the strongest supplier and the emergence of America**

The crude oil imports have increased as a consequence of a rise in consumption by the population and business networks – keeping in line with what is expected from an emerging power – and the rising of petroleum product export.

This up-going tendency has almost doubled the total crude oil imports, from 36 million tonnes, in 2005 to 67 million tonnes in 2015. Here we can also see how India has established a strategic diversification policy that has included a greater importance of America in the crude oil imports mix and Venezuela plays a role in this new situation. The Latin American country experimented how the shale oil revolution came into play and

### **India's Oil Imports Mix by Areas from 2005-2015, by years**



Graph 2

SOURCE: Ministry of commerce and industry of India

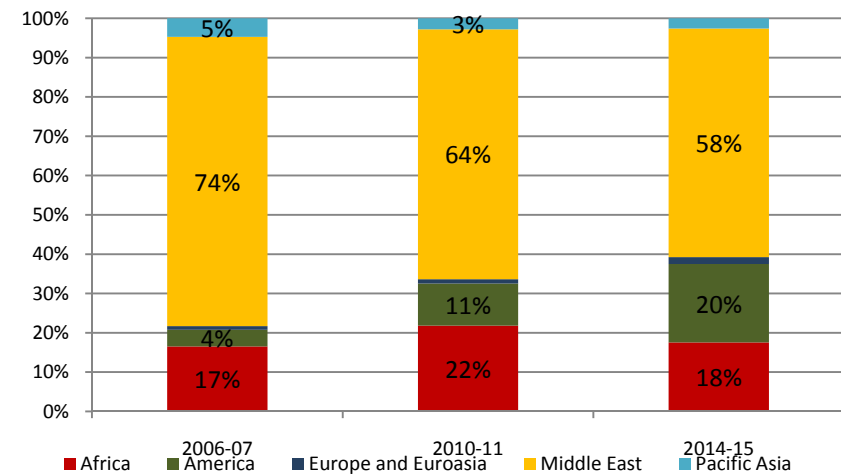
covered its exports to the United States between 2011 and 2012, forcing it to look for new markets. Thus, part of the Venezuelan crude oil that initially was destined to United States flowed to India's Republic.

## **Structural change derived from a better diversification of origins**

In graph 3, we can observe the increase in the relative weight of America, from an initial 4% in 2006-07 to a 20% in 2014-15. At the same time, it is important to notice how the increase in the relative weight is not at the expense of Africa but of the Middle East, which turned from 74% to 58% in this same period.

Africa, Europe and Pacific Asia stayed constant, and their interests lied more on the import of petroleum products from the Republic of India.

### **India's imports mix in 2005, 2010 and 2014, in percentage of total**



Graph 3

SOURCE: Ministry of commerce and industry of India

# India's geography and bilateral treaties...

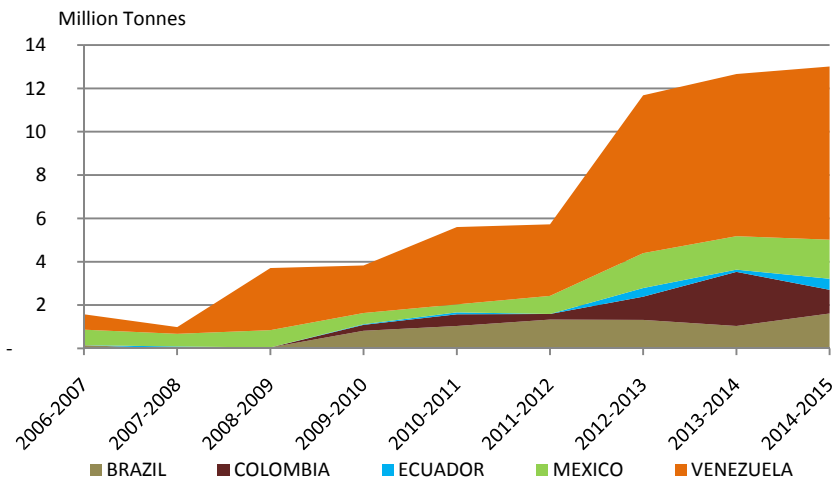
## Venezuela becomes a reference import country for India, accounting for 12% in 2015

After the study of the movements experimented by this sector of India's energy system, it is necessary to go into more detail to analyze the distribution of its crude oil imports mix.

Even though the country settled in the peninsula of Hindustan was not affected by the Arab Spring riots, due to that the vast majority of the African imports came from Nigeria y Angola– furthermore only the quantity from Egypt was slightly modified – it actually saw itself affected by other events, already discussed in this analysis, like the Iranian embargo.

Taking into account Graph 4, what seems striking is the already commented trajectory of Venezuela as crude oil exporter to India driven by the development of the Shale Revolution in 2011, which caused India's

### India's Imports Oil Mix from America between 2006-2015

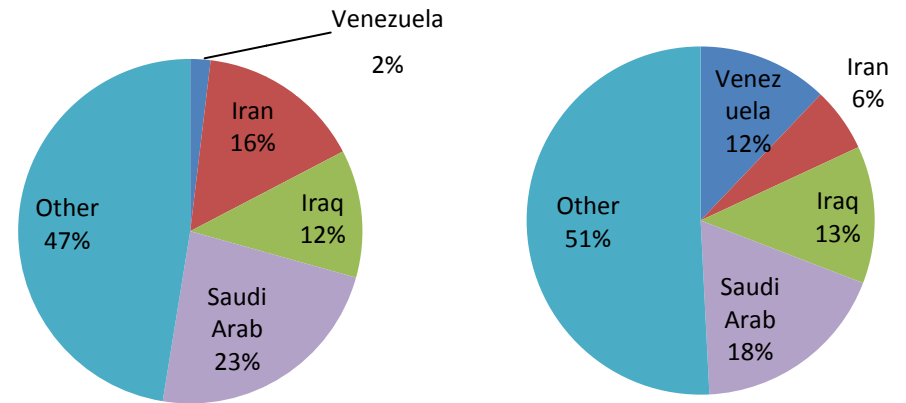


Graph 4

SOURCE: Ministry of commerce and industry of India

imports to go from 0,71 million de tons in 2006-07 to 8 million tons in the 2014-15 period. This increase arose in 2005 through a bilateral agreement between both countries to establish cooperation in the hydrocarbon sector. In 2013, Reliance Industries Limited (RIL), an Indian holding of energy companies, signed an agreement of crude oil supply for 15 years with PDVSA(Petróleos de Venezuela S.A.), the Venezuelan crude oil state company, under which Venezuela committed to send up to 400.000 barrels of petroleum to the Republic of India in the near future. Nowadays, 8 Indian companies and the PDVSA have signed agreements to established jointed-ventures, which remark the importance of this alliance.

However, Venezuelan role in the crude imports to India is not the only important one with a Latin-American origin. Brazil, Colombia, Ecuador or Mexico have also improved their positions, supporting a more diversified in India's crude oil imports mix to achieve security in the supply of crude oil.



Graph 5

SOURCE: Ministry of commerce and industry of India



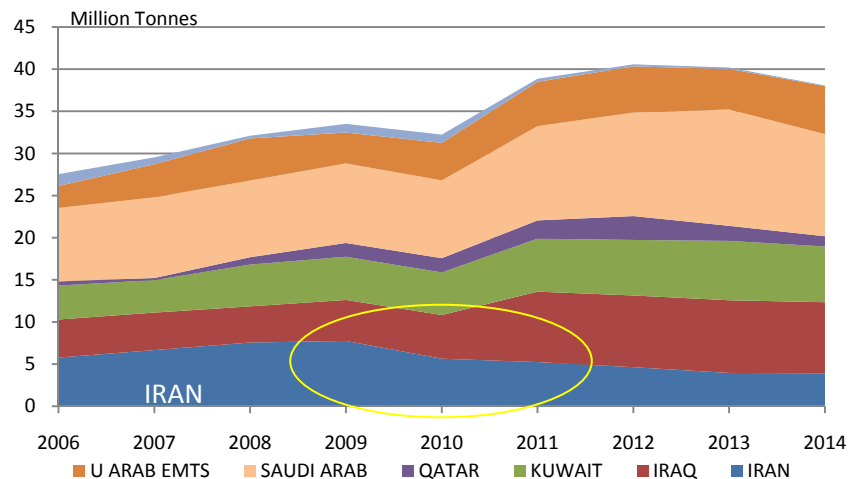
# India's geography and bilateral treaties...

Transferring the focus to the Middle East again, we should not leave certain things without consideration. First, taking a look into Graph 6 we can get an idea of the great diversification of the imports in this area. Five countries distribute the supply to India in similar proportions; United Arab Emirates, Kuwait, Saudi Arabia, Iraq and Iran. All these countries, that shape the known region of the Persian Gulf, take advantage of their close maritime connection to India – and especially to the region of Jamnagar – to achieve fast exports with low transportation costs.

All these countries have increased their exports of crude oil to India between 40% in the case of Saudi Arabia or 120% with regards to the United Arab Emirates, except Iran of course.

In graph 6 we can observe how the increasing tendency of the crude oil imports changes in 2010 and 2011.

## India's Imports Oil Mix from Middle East between 2006-2015

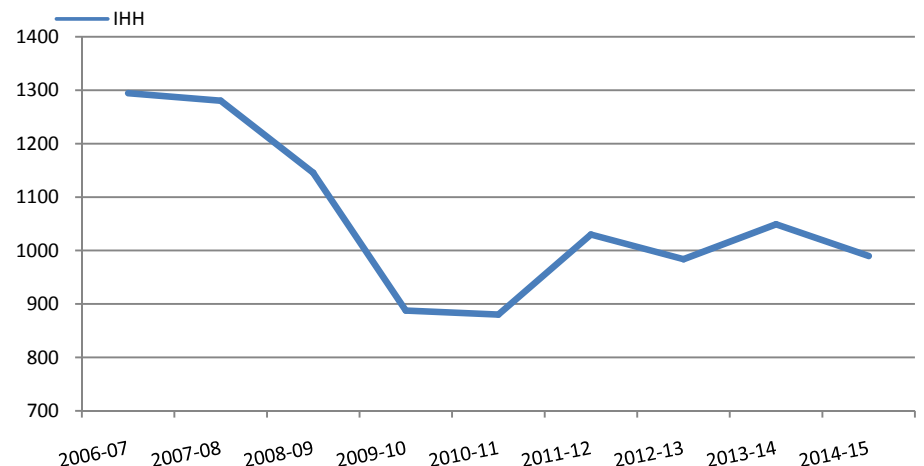


Graph 6 Year closing in April SOURCE: Ministry of commerce and industry of India

## The diversification has increased at the same time as imports

Taking in to account de Herfindahl index, we can observe how the diversification increased up to 2010 due to the greater imports of crude oil in this emergent country. But from this year on, the diversification sees itself reduced because of the vast increase in the imports from Venezuela, which was boosted by the bilateral agreements between both countries.

## The Herfindahl Index (HHI) from 2005 to 2014



SOURCE: Ministry of commerce and industry of India

# CONCLUSIONS

## **Overview**

Finally, the analysis has allowed us to obtain clear conclusions of this industry in the past 10 years.

In first place, it is observable that these three countries have experimented changes in their crude oil imports mix according to the different strategies that have applied under their needs and risks of provision. Among these needs and risks we can find both, fundamental and geopolitical aspects that as we have been seeing are the two main variables that drive the crude oil sector.

Changes in fundamentals have been observed in the three countries. The development of the U.S. shale revolution in United States has led to a lower level of imports and an increase of the national production. Contrary, in Spain and the Republic of India there have been an increase of the imports with their own particularities. Even though the refining industry has played an essential role for two petroleum product exporting powers, in Spain, a developed country, the national consumption has decreased whereas in the emergent country, India, the higher imports have been partly incentive by an increasing national consumption.

On the other hand, the geopolitical aspects have provoked diverse effects. United States have been taking a more isolationist position in this strategic sector, making U.S. reduce its dependence in respect with most of the areas around the world, apart from North America. In the case of Spain geopolitics appear more related with international conflicts, like the Arab Spring and the international response to the nuclear program of Iran. In India the key has been the establishment of bilateral agreements with Venezuela, a geographical diversification strategy that reduces the dependence of India with Middle East producing countries.

Thus, while United States has been reducing its diversification degree – as we have seen in the Herfindahl Index – establishing Canada as a determining ally in the sector, Spain and India have increase its diversification degree for a better security of crude oil provision.

## **World trade flows**

The analysis has let us discover how the U.S. Shale revolution has been the event that has caused the petroleum flow, creating a new crude oil commercial network:

- African crude oil migrates from United States to European countries – such as Spain – covering the gap that the Iranian embargo left.
- Venezuela also abandons U.S. to boost their commerce with the Republic of India.
- Middle East crude oil get considerably decreased the exports to U.S. widens.

## **Future**

Undoubtedly, all this changes that the sector is experimenting have not finished.

The end of the Iranian embargo can guide an approach to the crude oil imports mix which existed before 2012, letting Spain to recover and important ally in the energy sector – what could imply new markets for African exports–.

On the other side, the end of the oil exports ban introduces a new exporting country in the sector, what can be a big challenge for the equilibrium and the structure of the worldwide commerce.